APRIL 1956
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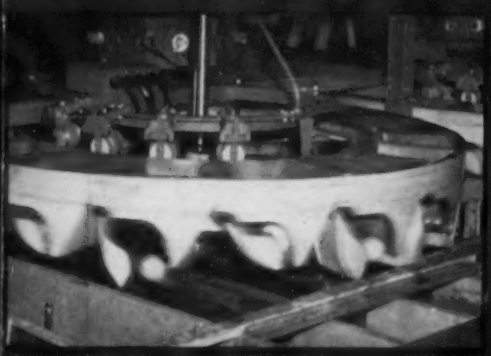
FOOD ENGINEERING

A McGRAW-HILL PUBLICATION

SANITATION · Wise manager gets real facts on plant's fight against filth p. 45

MATERIALS HANDLING · [illegible] are now carrying bulk liquid chocolate, p. 49



QUALITY CONTROL · "Mamaby" robot drops lemons in right color lanes, p. 46

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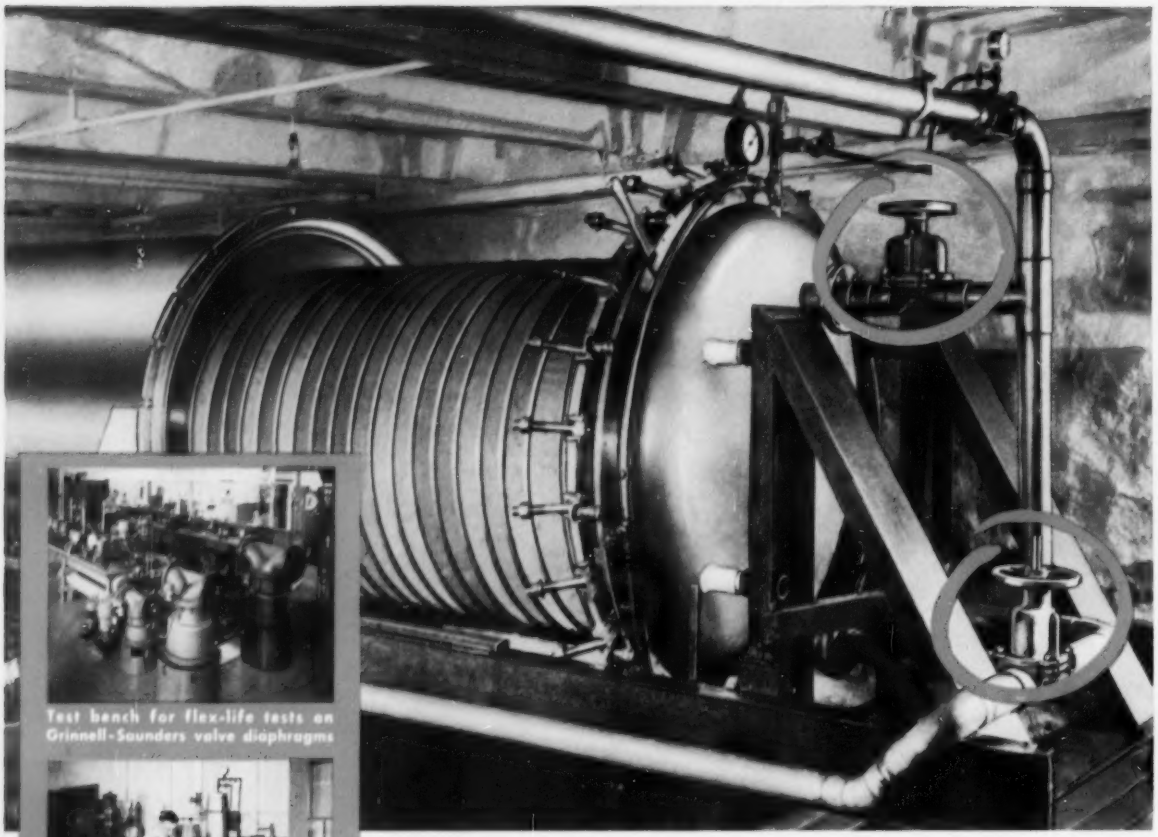

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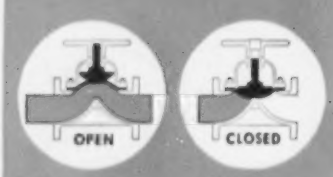
Test bench for flex-life tests on Grinnell-Saunders valve diaphragms

Experimental mold presses for making diaphragms. Man in foreground is checking temperature of mold

Testing apparatus for checking durability of diaphragms under very hot or cold conditions



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GRINNELL-SAUNDERS DIAPHRAGM VALVES

APRIL 1956

Volume 28 Number 4

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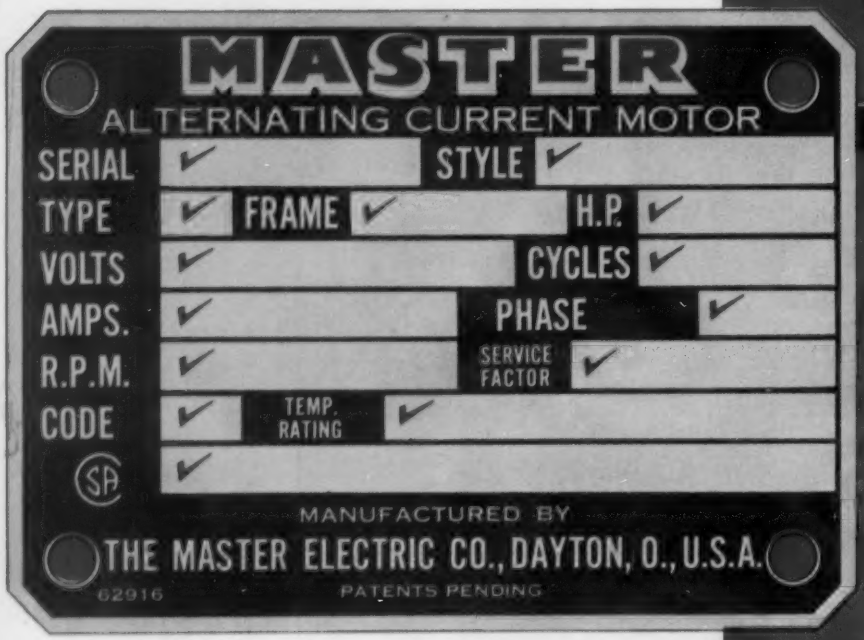

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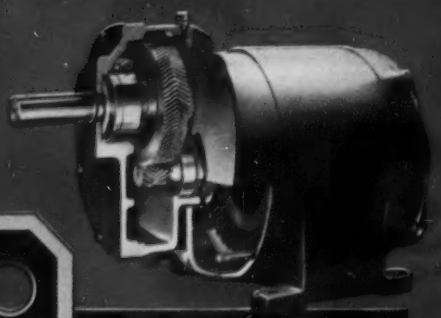
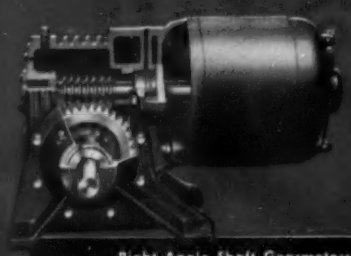

Parallel Shaft Gearmotors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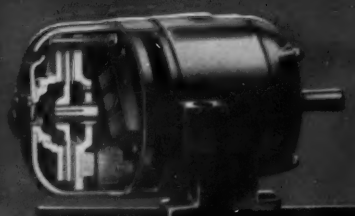
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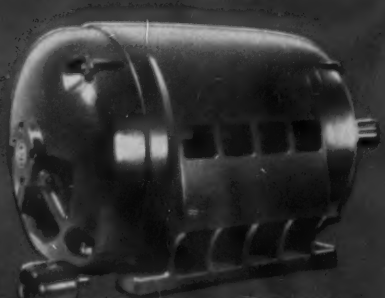
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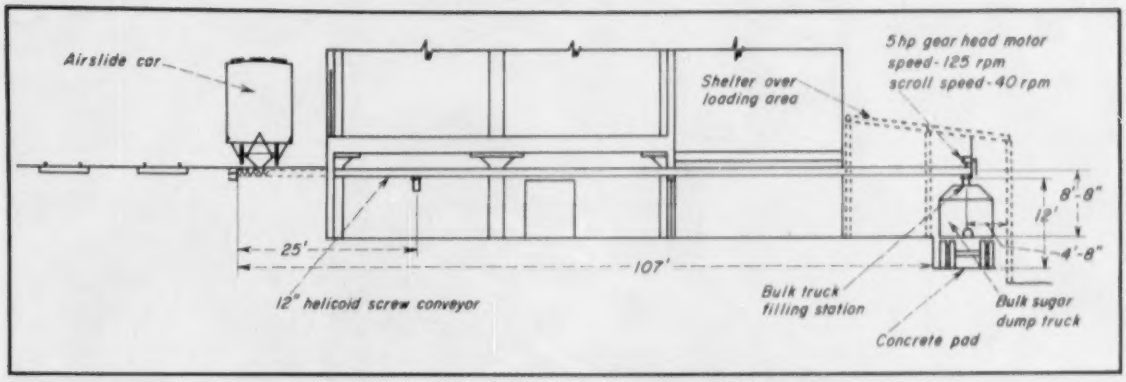


"Off Track" Bulk Truck Sugar Filling

Installing a system to supply Milwaukee customers with bulk sugar posed serious and costly problems for Utah-Idaho Sugar Co.

Airslide cars could be leased from General American Transportation Co. in Chicago for bulk delivery to the Milwaukee siding. And delivery by dump truck once loaded to customers was no serious obstacle.

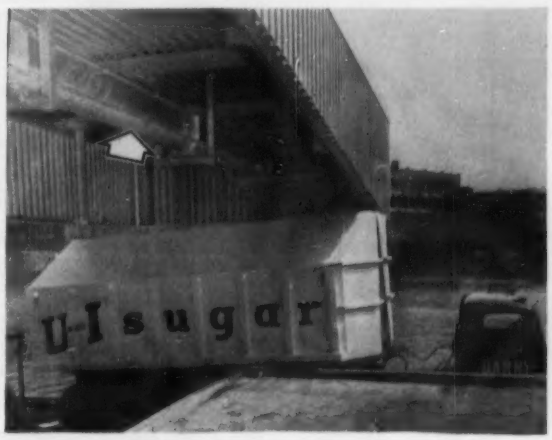
However, unloading station on Milwaukee's Terminal Storage Co.'s railroad siding was inaccessible to the specially built dump trucks. Furthermore, space in the warehouse was scarce, and equipment cost promised to be excessive.

Here's how these difficulties were overcome efficiently and economically:

From a bulk-car-unloading pit under the rail siding, a screw conveyor system was extended under the warehouse a distance of 112 ft. to an accessible location for truck loading (arrow in photo shows conveyor).

Driven by 5 hp. gearhead motor, the new conveyor system fills a 25,000-lb.-capacity truck in approximately 40 min. Control is push-button-operated by driver.

Sugar is first discharged directly from a horizontal screw



conveyor through a sanitary canvas sleeve into the center hatch of the bulk delivery truck. Then it overflows through partition openings into the other two compartments.—*FE Staff*

Acid Fume Control Method

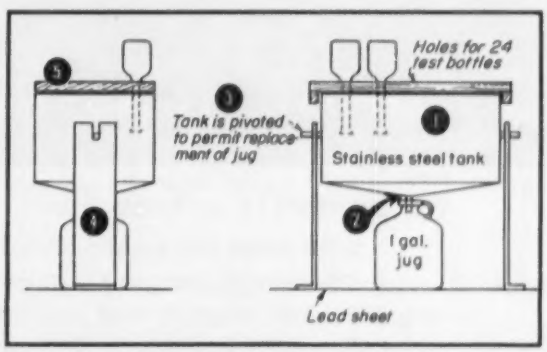
Offensive acid odors resulting from several hundred cream and milk tests run daily at our plant were a problem until an acid collection device was fabricated.

Here's how the unit was made:

First a box—(1) in sketch—was constructed of stainless steel. Bottom sloped in center to ½-in. drain tube (2). Finally, the metal-box tank was suspended on pivots (3) inserted in slots in metal supports (4).

Fitted over the top of the oblong tank was a ½-in. hardwood removable cover (5) drilled with 24 holes, each large enough to admit neck of a test bottle.

As each test is completed, the sample bottle is upended in one of the holes of the cover to drain into a glass jug.



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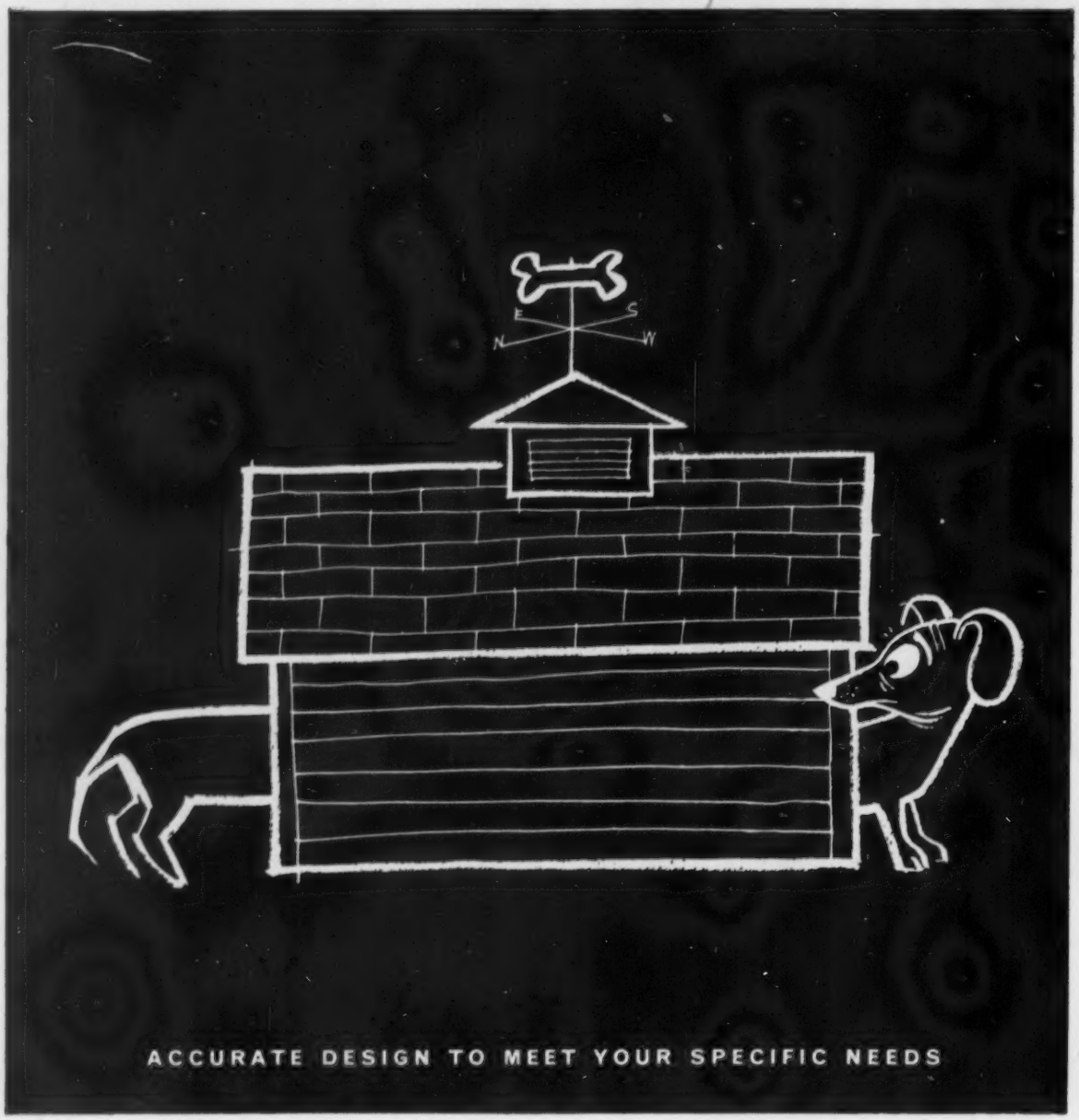

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When the jug is almost full, it may be removed by tilting the funnel on its pivot, and replacing it with another jug. Acid in the filled jug may then be disposed of safely.

Very little odor has been noticed since installing this unit.—*Hans E. Andersen, Farmers Union Creamery, Fremont, Neb.*

Automatic Ham Pickling

The electronically controlled ham pumping scale—developed as a joint venture of Engineering and Research Departments of Wilson & Co., Chicago—is a recent example of automation in the meat packing field. Here in the Chicago plant, 100% of cured ham production is now processed over this equipment.

Originally developed to reduce chances of human error and therefore produce hams with a uniform salt content, equipment has also resulted in increased production.

When this equipment is used, operator has only to insert pumping needle into the artery, clamp it in place, position ham on the scale, push necessary control buttons and then start preparing another ham. A predetermined percentage of pickle is pumped automatically into the ham and shut off automatically when the correct weight has been added.

Heart of pumping device is a flat disk of transparent material which replaces conventional dial and indicator of the Toledo scale. This disk is marked off in alternate transparent and opaque graduations. These are scanned by a photo electric device which counts bands passing through its beam and shuts off the pickle valve after a preset number of them have been counted. Variation in width of bands compensates logarithmically for weight of the ham, so that the volume of pickle pumped is a direct percentage of the ham's weight.

Provisions have been made whereby the operator may interrupt the pumping of the ham for inspection. Also, he may stop the pumping and reset the equipment if a ham is found to be unpumpable. He may use the two brine lines either independently or automatically alternately as desired. Colored signal lights mounted in the line of vision indicate the functioning of the units.

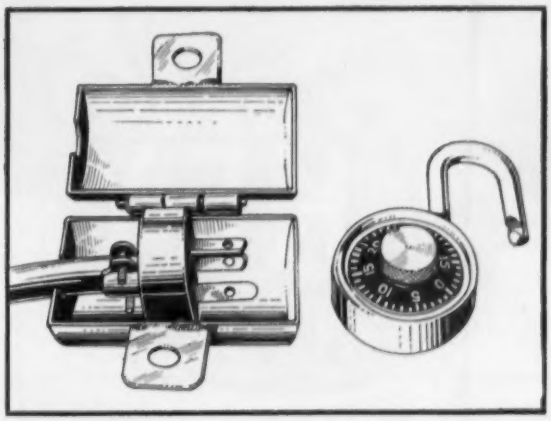
Electronic brain or controller unit containing electronic and electro-mechanical contacts is mounted in a marine plywood cabinet. Box also contains a heating unit to protect equipment from moisture and corrosion. Unit can be located far enough from the operating station to protect the cabinet and contents from splash or spray—even in an adjacent room.

Scale and all equipment are constructed with rugged packing plant service in mind. Aside from periodic checks and adjustments the only additional maintenance service necessary is periodic replacement of the photo electric light bulb and vacuum tubes.

Operating results are surprisingly close to the theoretical accuracy of this equipment which is plus .1% and minus .35%. Device reduces human error, improves uniformity of pumping and improves productivity of workers—estimated all-over improvement being approximately 30%.

Pilot model of this scale, which was developed by O. Garapolo and W. E. Moss of Wilson & Co., is still in daily service.

Manufacturing rights have been licensed to Toledo Scale Co. which has incorporated certain refinements and is now marketing the equipment as Toledo Artery Pumping Scale, Model 9640—*M. J. Hess, Acting Manager, Engineering Dept., Wilson & Co., Chicago.*



Extension Cord Lockout Device

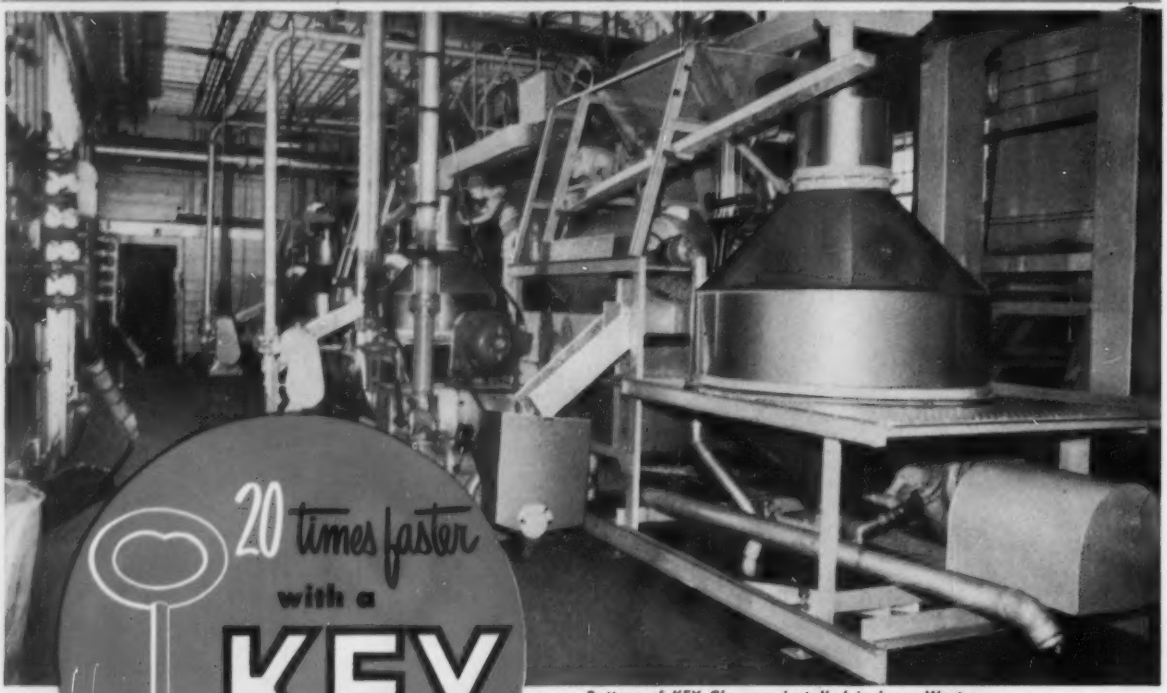
Here is a device which prevents inserting of the plug into an electrical receptacle while maintenance work is being performed on motorized equipment. It consists of a two-part hinged case (see sketch) which can be closed around plug and locked in position. Device is particularly useful on office equipment, power tools and laboratory apparatus or in any other place where locking-type switches are not provided.—*National Safety Council (DuPont Corporation contributed).*

Spray-Wets Walls to Waterproof Them

In our plant we have applied an efficient and clean method for uniformly wetting down basement or other concrete walls before applying waterproof paint such as Bondex, Rocktite, Dry Seal, etc.

We fill a 3-gal. weed-killer-sprayer with water to wet portions of basement walls before applying the paint. This has proved superior to using a whitewash brush, sponge or garden hose. These latter were either slow or too sloppy.—*M. A. Korol, General Foods Ltd., Windsor, Canada.*

SAVE MANPOWER—CUT CLEANING COSTS



Battery of KEY Cleaners installed in large Western frozen food processing plant.

20 times faster with a **KEY** FROTH FLOTATION CLEANER

If you are using the sorting belt system of cleaning peas or lima beans, it's time to replace with labor-saving, money-saving KEY Equipment. Not only will your manpower requirements be greatly reduced (KEY cleaner production with only one operator has equalled that of 20-26 sorters), but you will find it unmatched for efficiency in removing waste from product.

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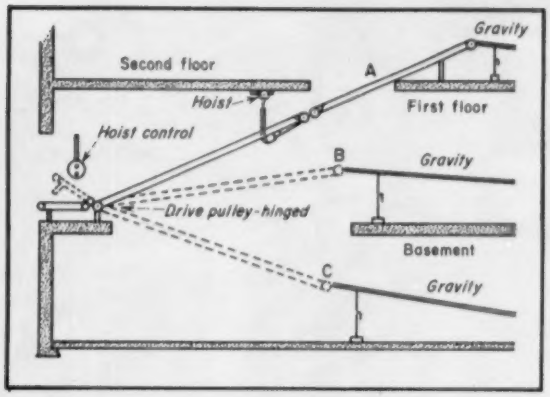


From Dock to Three Plant Levels

Problem was transfer of incoming materials from a loading dock to any one of three levels, economically and with minimum equipment, occupying minimum space.

Here's how the problem was solved:

Pivoted or swinging conveyor (see sketch) was installed on the first floor. This was fed from a loading dock by a short power-driven level conveyor on the same floor. Pivoted section can be raised from basement to the first or second floors, or lowered by means of a 1,000 lb. hoist attached to the ceiling of the first floor.

When materials are to be routed to the second floor, conveyor is elevated at an angle of 25 deg. to meet another permanently installed power-driven conveyor extending down from the second floor.

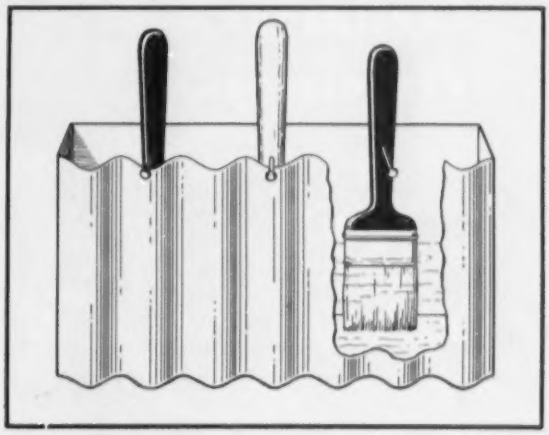
If products are to go to the main floor, the pivoted conveyor is lowered to make contact with a gravity conveyor on the first floor. When products are to be routed to basement, pivoted conveyor is lowered still further to meet a section of gravity conveyor in this lowest level.—*Rapid Handler, Rapid Standard Co., Inc., Grand Rapids, Mich.*

De-Fogging Clears View for Visitors

Along the route of the plant tour on which guests and visitors at Miller Brewing Co., Milwaukee are conducted, fogging of observation windows became a problem where the plate glass was faced on the processing room side with a temperature of 39 deg. F., and with room temperature on the corridor side.

Body moisture of visitors—as many as 40 at a time—fogged these windows (see photo), reducing visibility and thereby destroying much of the public relations benefit.

Window fogging was overcome when air in the observation area (more than 3,000 cu. ft.) was dehumidified. This was done by a Kathabar chemical-type humidity conditioner made by Surface Combustion Corp. of Toledo, Ohio. In this unit lithium chloride solution is employed to remove moisture from the air.

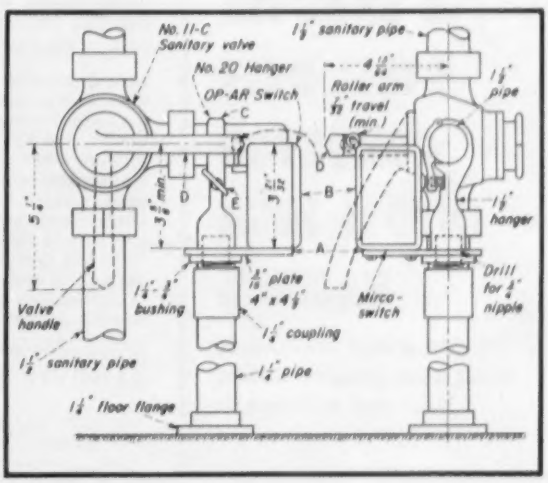


Paint Brush Holder

Here's an easy method for cleaning and storing paint brushes:

Equipment employed is a galvanized radiator humidifier (see sketch) readily available in hardware stores. Container is deep enough for average brush and requires only a small amount of solvent to submerge the brush bristles.

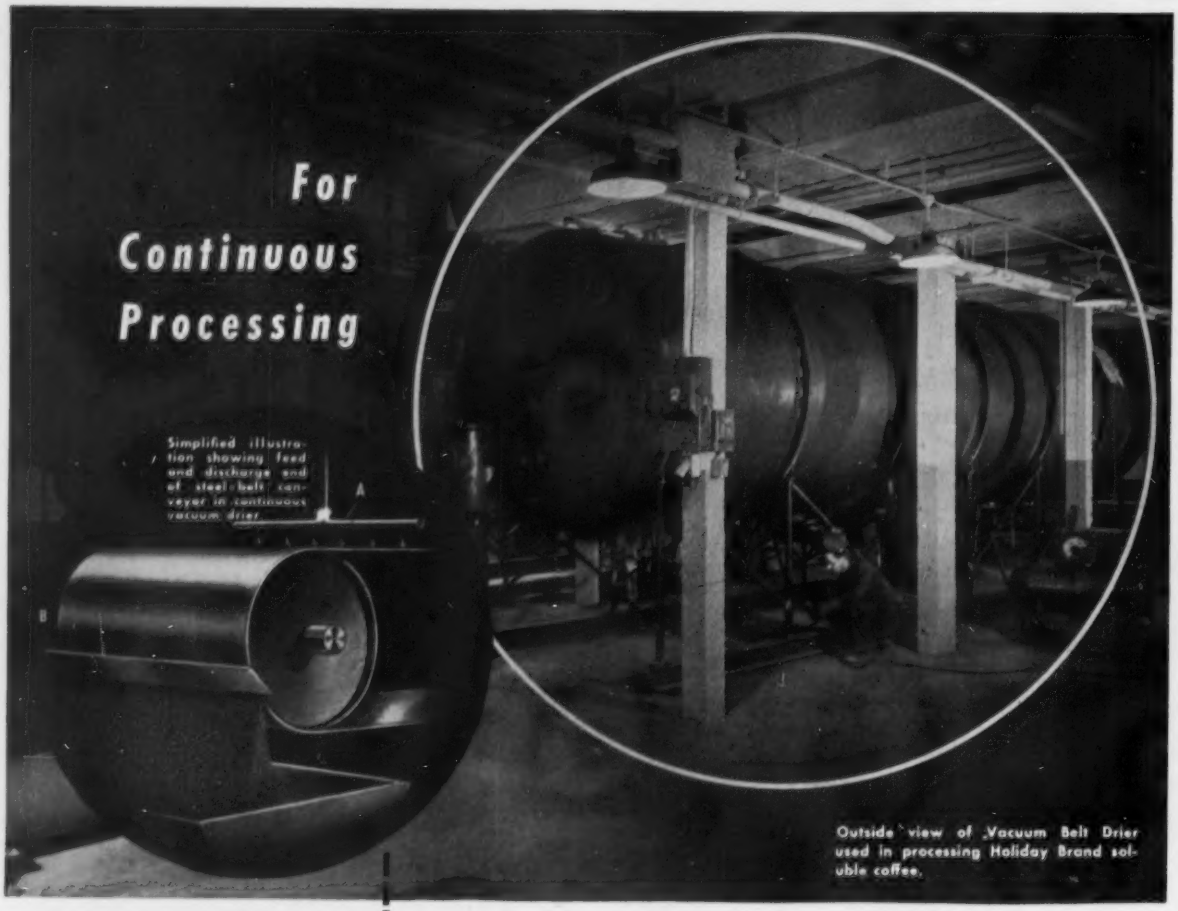
To suspend brushes, holes may be drilled in the handles and nails or pins inserted. Otherwise, regular paint brush hooks may be used.—*Cecil A. Quinn, Chemist, V & E Kohnstamm, Inc., New York City.*



Valve Interlock Control

Often it is very desirable to remotely indicate position of a two-way or three-way sanitary valve, or to interlock electrical controls used in automatic operations. Failure of operator to properly position the valve may seriously upset process control.

Since valve, and sometimes piping, must be removable


For
Continuous
Processing
Simplified illustration showing feed and discharge end of steel-belt conveyer in continuous vacuum drier.
A
B
Outside view of Vacuum Belt Drier used in processing Holiday Brand soluble coffee.

THEY DESIGNED A SANDVIK STEEL-BELT CONVEYOR INTO A HIGH VACUUM

Steel Belt Withstands Continuous Scraper Action, Heat and Moisture In This Vacuum Drier

S6-80

In this application, the special abilities of a Sandvik steel-belt conveyor have opened another door to better processing.

It's been the same story in plant after plant. Whether operating as independent units or integrated into special processing equipment, Sandvik conveyors keep on providing new and better answers to processing problems.

BASIC ADVANTAGES—Sandvik conveyors have a solid band of flat, stainless or carbon steel. This provides a smooth, hard, impervious surface that is easy to keep clean, has a high load capacity and a long service life. It can be fitted with simple discharge devices that scrape material off at any point. It can be used to convey materials through ovens. Belts can be of any length or width.

COOLING ARRANGEMENT—Sandvik conveyors can be built with a patented water-bed arrangement which cools from beneath . . . no water gets on top of the band. You can cool and convey, regulate thickness while cooling, cool and strip off gelatinous materials in sheet form, cool loose and pulverized materials, cool solids in sheet form and cool materials in layers.

ENGINEERING HELP—Sandvik's engineering department will be glad to work with you in determining where and how a Sandvik conveyor can improve your processing. Sandvik designs and builds complete conveyors to fit specific jobs.

Write, wire or phone for further information.

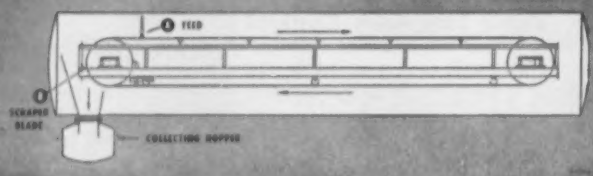
SANDVIK STEEL BELT CONVEYORS

Division Sandvik Steel, Inc.

1702 Nevins Road, Fair Lawn, New Jersey, Tel. FAIRLAWN 4-6200

Manufacturers Of Steel Belt Conveyors For Over Forty Years

SANDVIK STEEL BELT CONVEYORS



Schematic drawing shows how Sandvik conveyor operates in soluble coffee continuous vacuum drier designed and built by National Research Corporation for Holiday Brands, Inc. Concentrated coffee solution is sprayed on belt at point A and solidifies on the band as it travels the entire length of the conveyor and returns to point B. Here a scraper blade removes the crystallized coffee off the band into the collecting hopper.

for cleaning, it is not practical to support the remote control switch from either.

Here's a method of mounting a switch to allow positive alignment and still not interfere with dismantling of the equipment.

Mount a ¼ in. plate— (A) in sketch—on top of a 1¼ in. pipe support attached to the floor or adjacent wall by means of a flange. Purpose of plate is to support a micro-switch (B) and a standard sanitary pipe hanger (C).

As valve handle (D) is turned to the horizontal position, the roller arm of the switch is engaged and contact closed. Because distance between micro-switch and pipe hanger is fixed, positive alignment of the switch roller in respect to the valve handle is attained on re-assembly of valve and piping.

This method of mounting will not interfere with hand-movement of the valve. However, it will prevent any possible jamming of the fingers during the operation of the unit.

Piping may be dissembled by merely releasing the thumbscrew (E) on the piping hanger and removing the valve and pipe without disturbing the micro-switch. Minor adjustments in height are attained by raising or lowering the coupling or bushing, or placing shims between pipe hanger and plate.—*Leonard F. Patridge, Tuckahoe, N. Y.*

New Pail and Drum Liner

Trouble-proof small-lot shipping of its soft drink concentrates was the special problem faced by Cott Beverage Co., New Haven, Conn.

The standard steel 5-gal. pail with inner surface coated with a phenolic base liner wasn't the answer—because the concentrates had a tendency to dissolve the enamel-like lining into tiny flakes.

But Cott kept after the problem, and the first key step toward a solution was a plastic-bag liner. However, the thin bags would break in transit.

Then through research by Electric Wave Products, Inc., New York City, and the Container Div. of Jones & Laughlin Steel Corp., a special heavy-gage plastic liner was developed.

And this liner is now "doing the trick" in commercial use.

Constructed of polyethylene tubing made by Durethene Corp., Chicago, it is called the first closed-top plastic liner that becomes an integral part of the steel container. Also, this plastic is the heaviest to be made into an electronically-sealed contour-type liner, according to the statement of the manufacturers.

These heavy liners (see left photo) are now available in 5-gal. shipping pails with ring-sealed covers rolled on. Pouring-fittings made of the plastic are also available, making the product-contact surfaces poly throughout. Some additional sizes will be available, namely, 10, 15, 30, and 55 gal.

Cott officials say these liners don't break, no matter how rough the handling, and that they have solved all their specific problems, including "osmotic seepage," which was due to the porous quality of the previous thinner liner. In addition, use of the improved containers has reduced labor costs.

One factor here is that containers and liners (see right photo) come to the plant ready for filling. Formerly, liners had to be hand-stuffed into containers.

Except for an occasional "sight" inspection when they arrive, the liners need no formal check, says Cott. A further asset is greater container storage life—that is, users may hold the concentrates in these containers, since the liner can be depended upon to stand up.

CAN YOU USE $50?

Then here's an opportunity to get it.

Send one of your ideas to FOOD ENGINEERING.

Each month $50 is presented to someone like you for the best item in this department. And the chance that it will be you is now running about one in twelve.

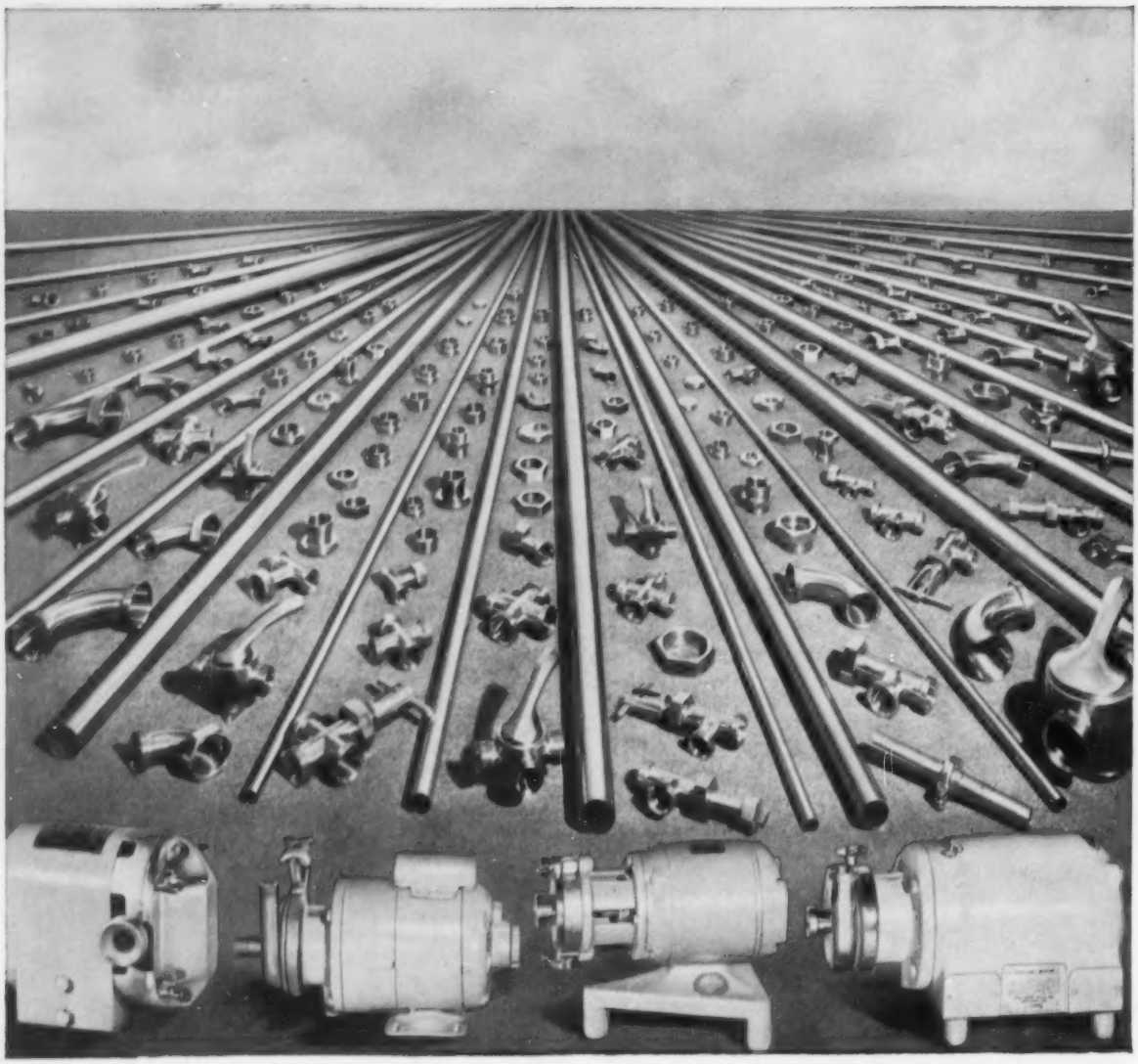
Also $5 to $15 is paid for each contributed item used. So a few minutes time may net you as high as $65.

Just send us the facts about your idea and its application. And include a free-hand sketch or snapshop to illustrate it.

We'll do the finished writing and drawing for you.

Send it today, before you forget. Address it to Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.—The Editors.

FEBRUARY PRACTICAL IDEA WINNER was "Spray Wash Speeds Cleaning," sent in by R. B. Drexler, Assistant Plant Superintendent, Rochester Dairy Co-op, Rochester, Minn.



Pity the poor bacillus

All that beautiful metal . . . and no place for bacteria to hide in this mass of Cherry-Burrell stainless steel pumps, sanitary tubing and fittings.

No place at all because even the smallest bacteria have to have some crevice to get a toehold—and how can they when there are *no crevices, no pockets, not even a sharp corner?*

In the complete Cherry-Burrell line you'll find every valve and fitting you can possibly use . . . the pumps to push liquids through them . . . and the tubing to serve as sanitary highways to get your liquids where—and *how*—you want them.

Next time you want a single fitting or a carload of them . . . a short-length section of tubing or thousands of feet . . . centrifugal or positive pumps, discuss it with your Cherry-Burrell Representative, or write —

CHERRY-BURRELL
CORPORATION

427 W. Randolph Street, Chicago 6, Ill.

Dairy • Food • Farm • Beverage • Brewing • Chemical • Equipment and Supplies

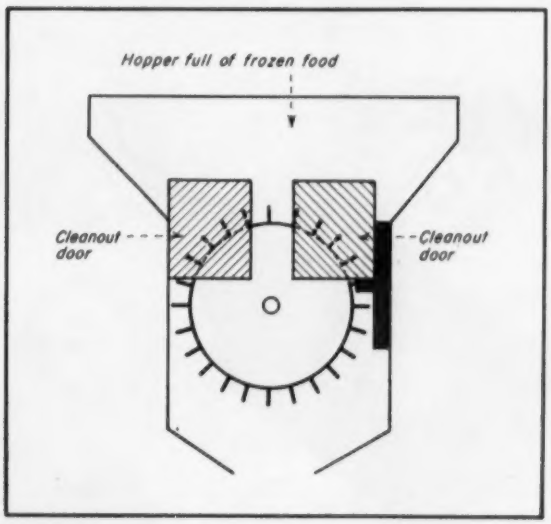
SALES AND SERVICE IN 58 CITIES — U.S. AND CANADA

Accurate Check on Heater Temperature

Formerly, when trouble arose on any of our bread wrappers we checked on the heaters. However, this meant stopping machine and, by the time we had made a meter check, temperature had built up to a false heat reading.

To overcome this situation we bolted one end of a piece of constatan wire to the heater plate and the other end to a radio phone plug. Now all we have to do is plug the meter into the phone plug and we get an accurate reading —because it is taken under production conditions. And production is not interrupted.

Since heaters are in different positions, and each wire of a different length, we installed resistors in each line to compensate for the different lengths.—*Morris Letnick, Electrician, Christy Bread Ltd., Montreal.*



Food Freezing Aids

Here are four ideas to help in making frozen foods:

1. Machines for breaking up and separating bulk frozen foods often seem too small for the job. They also plug up frequently. Cleaning through the feed opening on top of the breaker is speeded if doors (see sketch) are added.

2. Package-wrapping machine's operation can be stepped up if box channels are lubricated with a tray release agent. This type of lubricant is inexpensive and insures smoother operation and tighter labels.

3. Electrical outlets for power tools located in frozen food storage rooms are often covered and filled by frost. An outlet just outside the refrigerator door is not only more convenient but safer.

4. For safety, it is advisable to plainly mark lock-out switches and main power switch so that anyone can read and understand them in case of emergency.—*Leonard W. Moore, Supervisor, Pictsweet Foods, Inc., Albany, Ore.*

Industry Potential Seen for Titanium

Titanium has some exceptional properties in strength, weight, and corrosion resistance (especially to chlorides). As it becomes more readily available from supply and price standpoints, and as fabricating processes are perfected, it will become of increasing interest to industry, perhaps eventually achieving a position somewhat comparable to that which aluminum now occupies.—*Technical Bulletin, General Foods Corp., White Plains, N. Y.*

Saves $20,000 in Filling-Line Conversion

At a maximum cost of $100 (mostly for the fabrication of three special star wheels), we converted our filler and capper line to gallon jugs.

The company's filling and closing line was equipped only for half-pint and quart bottles, and conversion to fill gallon jugs became a pressing problem in meeting competition. Company did not wish to repeat conversion procedure used at another of its plants since this would have cost an estimated $20,000.

Three specially shaped star wheels (top photo shows two) were milled and installed, replacing standard wheels. And a worm gear with a shaft was then replaced.

One "star" moves jugs off a conveyor line, another positions them for filling, and a third positions them for capping. Though conveyor runs at a constant speed regardless of bottle size, the rpm. of the star wheels determines the speed with which jugs leave filler and enter hooder.

In addition to installation of "stars", guides for smaller bottles were changed to make room for the jugs. Then, in the hooder, capper lifter base was shaved about ½ in. on either side. The horizontal worm gear that positioned all smaller bottles in the capper was removed and replaced with a spinning horizontal shaft (second photo). Shaft performs no function in the converted unit, but is connected to the universal joint to drive the worm gear. Removal of the joint was not necessary.

To prevent jamming and possible breakage, an air switch was placed on the conveyor about 10 ft. before the filler. It controls the number of jugs admitted.

Because it takes longer to fill gallon jugs than quart bottles, output has been reduced. On the other hand, breakage is rare. One real advantage of conversion is that no more than 15 min. is needed to remove original manufacturer's wheels and gear from the line, and insert our improvised star wheels and shaft.—*Frank Lyman, Chief Engineer, Carnation Co., Spokane, Wash.*

THE SECOND SALE

TELLS THE TALE

Better taste and texture, improved appearance, and prolonged freshness are possible for many foods by using Atlas emulsifiers and sorbitol. Small wonder Atlas products give many food brands the extra appeal needed for that all-important second sale.

SHORTENING with Atlas emulsifiers, for instance, can be counted upon to produce consistently superior cakes, toppings, icings, etc. . . . not 90% of the time but *all the time*. Only Atlas emulsifiers have an optimum balance of monoglyceride (imparts excellent cake baking and water absorption properties) and diglycerides (provides additional tolerance . . . assuring *consistently* superior performance under all baking conditions).

SHREDDED SWEETENED COCONUT stays soft and tender longer because sorbitol helps texturize it. Coconut treated with sorbitol also has outstanding color and flavor retention.

IN SWEET ROLLS AND DANISH PASTRY,

ATMUL emulsifiers are the most effective and economical way to prolong fresh baked softness and texture.

Bread, candy, ice cream, icings, beverages, shredded coconut, cookies, and dozens of other foods sell better—thanks to new values in taste appeal that they get from Atlas ingredients. When you're looking for ways to boost your product's progress . . . or to create new food ideas for growing markets . . . see what sorbitol and Atlas emulsifiers can do for you. Write to us for samples and suggestions.

FOOD INDUSTRY DEPARTMENT

ATLAS

CHEMICALS DIVISION
ATLAS POWDER COMPANY
WILMINGTON 99, DELAWARE

ATLAS POWDER CO., CANADA, LTD.
BRANTFORD, ONTARIO, CANADA

ATLAS FOOD INGREDIENTS

SORBITOL—helps prevent rapid loss or gain of moisture . . . retards hardening in dry weather and sogginess in damp weather. Modifies crystal structure of mixed sugar systems . . . keeping sugar containing foods soft and tasty longer. Economical in cost, nutritious, pure.

ATLAS EMULSIFIERS—the only food emulsifiers that offer both high monoglyceride content for superior emulsification effects and "diglyceride bonus" to assure thorough dispersion of the monoglyceride. Economical to use . . . made to highest standards of purity in the world's largest food emulsifier plant.

Nicholson *steam trap* quality *gives you* . . .

extra stamina for severest service

Write, today, for your copy of new Bulletin 10-55—for detailed information.

Nicholson quality . . . throughout . . . means the extra strength, extra capacity, extra stamina that never let down. And, Nicholson quality pays off, when it comes to discharging condensate and air from food processing steam lines and equipment . . . most efficiently, dependably, economically.

- **powerful valve action—big husky bellows.**
- **positive shut-off—finely ground valve and seat.**
- **high capacity—effective use of large orifice.**
- **each unit service tested—with steam.**

When less than the best won't do, specify Nicholson.

NICHOLSON

W. H. NICHOLSON and Company

TRAPS • VALVES • FLOATS • METAL PARTITIONS
LAUNDRY, DRY CLEANING AND PRESSING MACHINERY

14 OREGON STREET, WILKES-BARRE, PA. • SALES AND ENGINEERING OFFICES IN 98 PRINCIPAL CITIES

A big reason for the Clark Electrics at Associated Grocers, Seattle, Washington, is the dependable service offered by Preston Faller Co., Seattle. This service is typical of all Clark dealers.

Clark Electrics at Associated Grocers

and there's a good reason . . .

No one can afford production lags. But the before and after of all modern production is efficient materials movement. Electric trucks move material at the lowest cost per ton mile—and with Clark Electrics, you get *the* electric truck with the power saving dual field motor that provides *more* ton-miles per battery charge.

But it takes more than features. How about 3 years from now, or 5 years, or 10? That's when you depend on service—fast, local service.

And that's where your local Clark dealer comes in. He offers prompt mobile service for emergencies, the largest supply of service parts in the industry—genuine Clark parts that are warranted and guaranteed for quality. And he provides a completely equipped shop for rebuilding, a fleet of rental trucks to help you over peak work loads. Fact is, he offers a *complete* service package. Look in the Yellow Pages under "Trucks, Industrial" for the Clark dealer nearest you.

A BETTER BUY WITH LOCAL SUPPLY—*Genuine Clark Parts*

CLARK EQUIPMENT

Industrial Truck Division
CLARK EQUIPMENT COMPANY
Battle Creek 14, Michigan

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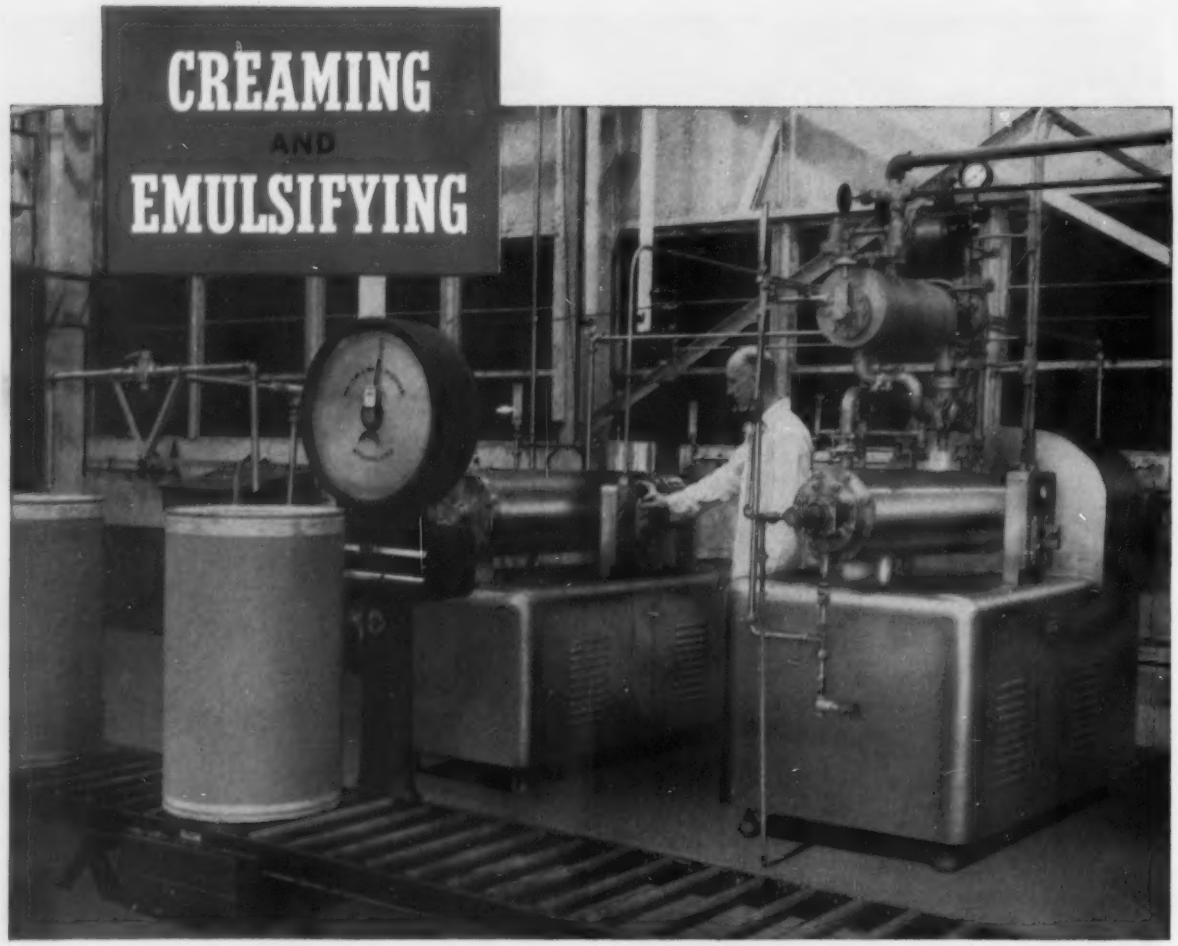


Monoglycerides improved with Votator® PROCESSING APPARATUS

A more uniform, homogeneous food emulsifier of better color is being produced by Atlas Powder Co., Canada, Ltd., with VOTATOR* Processing Apparatus. It creams and emulsifies fatty-based monoglycerides, a product known as "Atmul 122". Continuous chilling and plasticizing reduces product temperature from 160° to 85°F. at a rate of 1800 pounds per hour. The enclosed processing system safeguards product purity. The VOTATOR Processing Units comprise a neat, compact installation with fully automatic control of temperatures, viscosity and output rate.

VOTATOR Processing Apparatus, performing a wide range of heat transfer and mixing functions is cutting costs and improving quality of many food products. Find out how it can help *you!* Write for booklet V48R today.

*VOTATOR—Trade-Mark Reg. U. S. Pat. Off.

Product is creamy, homogeneous and of uniform color. Purity is assured.

The GIRDLER Company

A DIVISION OF NATIONAL CYLINDER GAS COMPANY
LOUISVILLE 1, KENTUCKY

VOTATOR DIVISION: New York • Atlanta • Chicago • San Francisco

How plastics are adding new sales power to food packages!

Low-cost containers prove their profitability by selling and serving your customers!

Gone forever are the days when sturdiness was the sole requirement of a food package.

With self-service so dominant in modern marketing, the successful package must be star salesman as well as container. It must distinguish your product from a maze of competition.

This new concept of merchandising has pushed plastics to the front as a preferred and profitable packaging material. The advantages of plastic packages are unique and numerous:

Their transparency displays the quality of the food inside with genuine appetite appeal.

Their ruggedness eliminates breakage—their light weight reduces shipping costs.

Their "formability" often makes it possible to create a package with exciting re-use benefits.

In other cases, plastic packages can reduce spoilage—or promote related sales.

Pictured on the next three pages are examples of how foods packaged in Monsanto's styrene, polyethylene and cellulose acetate are scoring bull's-eyes at point of sale. *For further information, you are invited to write Monsanto Chemical Company, Plastics Division, Room 1164, Springfield 2, Mass.*

MONSANTO

Monsanto supplies styrene, polyethylene and cellulose acetate for extra-profit packaging.

Plastic double-wall tumblers boost sales of cottage cheese!

Colorful insulated tumblers sample new customers and assure repeat sales!

They're beauties...and they've proved a real profit-maker for dairies in every part of the country! That's because an attractive premium package "samples" new buyers.

"Tropicana Tumblers," a premium package molded of Monsanto's Lustrex styrene plastic, pave the way for getting new cottage cheese customers . . . and often getting reorders week after week.

Lustrex styrene plastic gives these tumblers outstanding eye appeal. Their break resistance is remarkable. And the odorless, tasteless, nontoxic properties of Lustrex protect the purity of any food. A double wall, separated by an insulating vacuum, keeps iced drinks cool down to the last swallow.

"Tropicana Tumblers," available in 8 colors, are supplied in 10-oz. size on a guaranteed performance basis by the Mallory-Randall Corp., Brooklyn, N. Y. More than 90 dairies are already using them to send their sales of cottage cheese soaring to profitable new heights.

Monsanto will gladly put you in touch with plastic packaging specialists who will help you work out your own packaging requirements. *Write Monsanto Chemical Co., Plastics Division, Room 1164, Springfield 2, Massachusetts.*

LUSTREX*

styrene plastic

MONSANTO

Monsanto also supplies polyethylene and cellulose acetate for packaging.

*LUSTREX: REG. U. S. PAT. OFF.

Polyethylene "girdle" improves display of 6-can beverage pack!

Sale of multiple unit is doubled and tripled—handling is easier, too!

Six 12-ounce cans of any beverage can now be packaged in a transparent showcase that displays the familiar label on every can!

A band of polyethylene film holds the cans snugly together—and takes colorful imprinting that promotes the unit.

600 cans a minute are packaged in this manner. A flat roll of imprinted polyethylene film is continuously made into a tube and cut into bands. Bands are then automatically stretched about ¾-inch and slipped over the cans.

Polyethylene film retains its tension on the cans through changing weather conditions and under refrigeration.

Besides improving display, the "Show-Pak"* unit is lighter in weight than conventional cartons and requires less storage space. It comes complete with retractable handle.

It's a striking example of the great new possibilities for profitable packaging that polyethylene now makes possible. Monsanto will be glad to put you in touch with packaging specialists who will work with you on your own requirements. *Write Monsanto Chemical Company, Plastics Division, Room 1164, Springfield 2, Mass.*

MONSANTO *Polyethylene*

MONSANTO

Monsanto also supplies styrene and cellulose acetate for packaging.

*PATENT NO. 2667995 IN U. S. PAT. OFF. BY THE BERADA CORPORATION, SAN MARINO, CALIF.

Plastic candy boxes invite every shopper to reach for a sweet!

Sales climb sensationally because the contents display so appetizingly!

It's almost impossible to resist candy or nuts at point-of-purchase when they're packaged in handsome, transparent gift boxes.

Shoppers buy on impulse. A glimpse of the assortment inside is enough to close the sale.

Monsanto's Vuepak (cellulose acetate) is an excellent material for confectionery packages because it has such exceptional clarity and rigidity. It also forms easily to almost any shape and combines readily with metal or cardboard.

You can imprint Vuepak with a colorful selling message—or a decorative, seasonal design which "wraps" the contents elegantly as a gift.

The Vuepak package safeguards the freshness of candy, nuts and other foods. Purity of flavor is retained because cellulose acetate is tasteless, odorless, nontoxic. It is also greaseproof.

The attractive stock packages pictured are fabricated of Monsanto's Vuepak by Weinman Brothers, Chicago, Ill.

Need help? Monsanto will gladly put you in touch with specialists in plastics packaging who will work with you on your own packaging requirements. *Write Monsanto Chemical Company, Plastics Division, Room 1164, Springfield 2, Mass.*

VUEPAK*

cellulose acetate

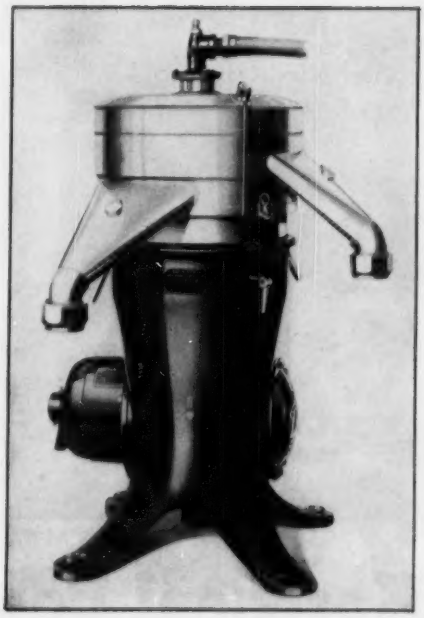
MONSANTO

Monsanto also supplies styrene and polyethylene for packaging.

*VUEPAK: REG. U. S. PAT. OFF.

The Most Profitable Processing Is CONTINUOUS Processing...

by DE LAVAL!



If there are filters or settling tanks anywhere in your production line... you've got a wide-open chance to cut costs and improve the profit picture!

Because De Laval Centrifugal Separation or Clarification can break production bottlenecks...change stop-and-go processing to continuous operation...save time... labor... money!

De Laval can not only do the job faster but better!

Ask for all the facts... it will pay you in higher profits!

DE LAVAL
for faster processing systems

THE DE LAVAL SEPARATOR COMPANY Poughkeepsie, New York • 427 Randolph St., Chicago 6 • DE LAVAL PACIFIC CO. 201 E. Millbrae Ave., Millbrae, Calif.

B.F.Goodrich

Photo courtesy Alfred Nickles Bakery, Inc., Navarre, Ohio.

Bakery changes to Koroseal belts, gets 11 times longer service

IN this bakery, bread used to ride canvas belts from ovens through cooling tunnels to wrapping tables. But oily film clinging to the warm loaves stained the canvas, made it impossible to keep clean, soon ruined it.

When a B. F. Goodrich distributor heard belts were lasting only a month, he suggested they change over to Koroseal conveyor belts. They've lasted a year—11 times longer—and are still going strong. No maintenance, no sign of wear.

Because it's made of Koroseal flexible material, this improved food-handling belt stands cooking oils, animal fats, most acids—and it stands hard use, rough handling, and just about everything else that ruins most material. And Koroseal belts have no odor, no taste, never get rancid.

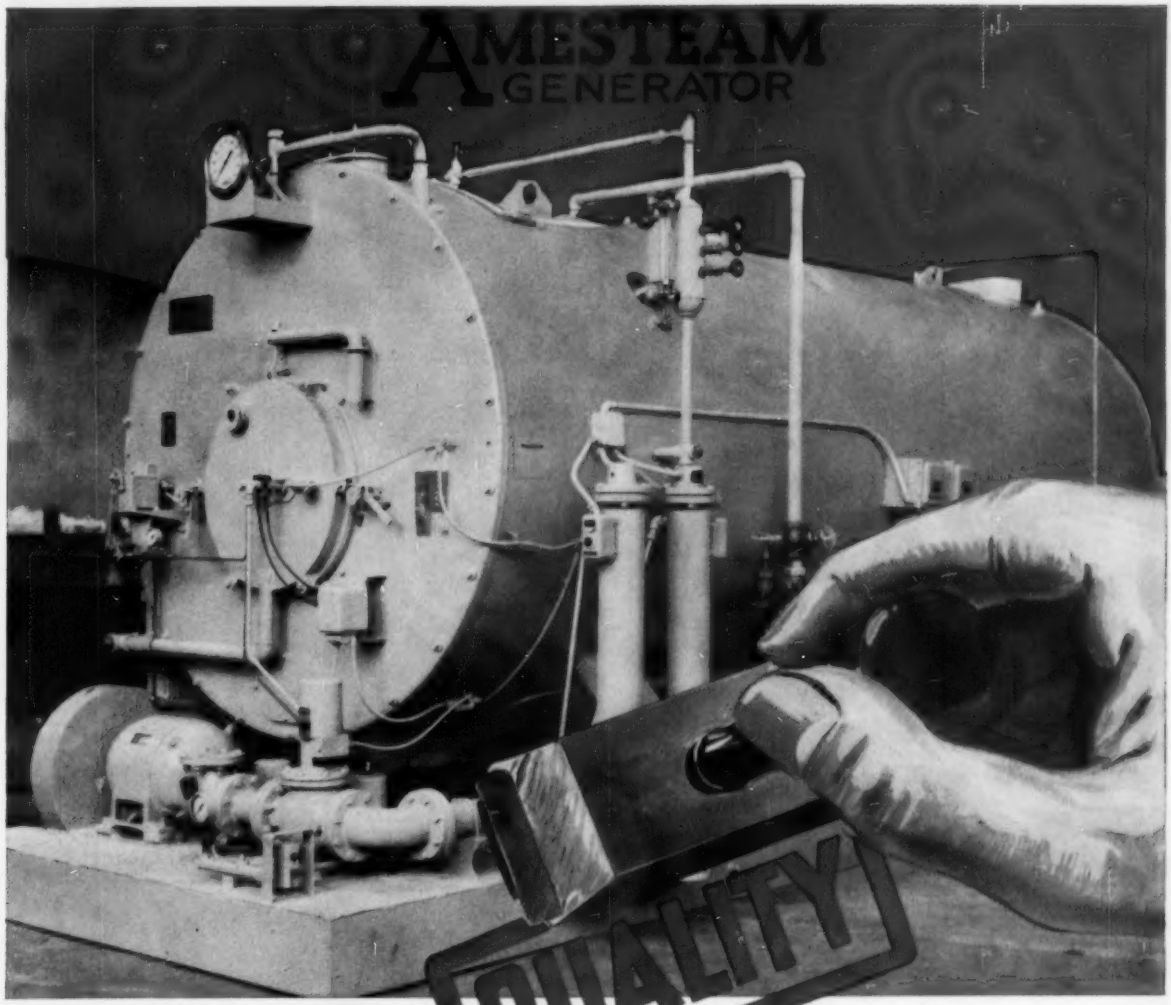
Unlike belts that are just coated with plastic, Koroseal is used throughout the B. F. Goodrich belt, and so resists cracking and peeling, never gets soft or sticky. Its smooth, polished surface makes it a cinch to clean, too. You don't have to scour it. Just a wipe with a damp cloth and detergent, and the Koroseal belt is as clean and new looking as ever.

Another belt, developed by B. F. Goodrich for the food industry, is a green belt that's ideal for inspection lines and on processing operations where grease and heat or cold are a problem. The B. F. Goodrich distributor near you will be glad to tell you more about these belts. Give him a call, or write *The B. F. Goodrich Co., Dept. M-623, Akron 18, Ohio.*

Koroseal—T. M. Reg. U. S. Pat. Off.

B.F.Goodrich

INDUSTRIAL PRODUCTS DIVISION



It takes a Boiler to produce LOW COST STEAM

. . . and isn't low-cost steam what you're actually after in a boiler? There's only one way to get it — with a boiler of proven high quality.

Ames Iron Works has been building such boilers for 108 years, putting into them the engineering, material and workmanship necessary to give the best possible service to the customer.

Today's AMESTEAM GENERATOR, with its simple, efficient, 3-pass design, embodies the best of those 108 years — the latest developments which we know are practical. And the number of customers ordering their 2nd, 3rd, 4th, 5th and more AMESTEAM GENERATORS justifies the painstaking care that goes into these units.

For a quality boiler that's bound to give you overall steam economy — plus the well-known AMES 24-hour service — specify AMESTEAM GENERATOR — 20 sizes, 10 to 600 h. p. 15 to 200# Oil, Gas or Oil-Gas Combination . . . *Mail coupon today.*

AMES IRON WORKS INC.
BOX B-46 OSWEGO, N. Y.

AMES IRON WORKS
BOX B-46, OSWEGO, N. Y.

Gentlemen:

Please send me further information on AMESTEAM GENERATORS and name of the nearest representative.

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COMPANY .....

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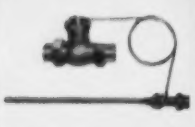
FULTON SYLPHON TEMPERATURE REGULATOR

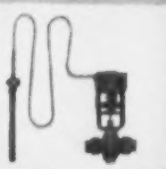
If A Temperature Regulator Will Do It, Fulton Sylphon Has It

No. 1100 FULTROL THERMOSTATIC PILOT CONTROLLER—for pneumatic or hydraulic control systems.



Nos. 920-D1, E1, F1 & G1 TEMPERATURE REGULATORS—control of liquid temperature in food processes, etc.

No. 999-T TEMPERATURE REGULATOR—for process control, water heaters, etc.



No. 999 TEMPERATURE REGULATOR—for liquids, air or gases in industrial processes, etc.

No. 923-Q TEMPERATURE REGULATOR—quick adjusting type for process control, etc.

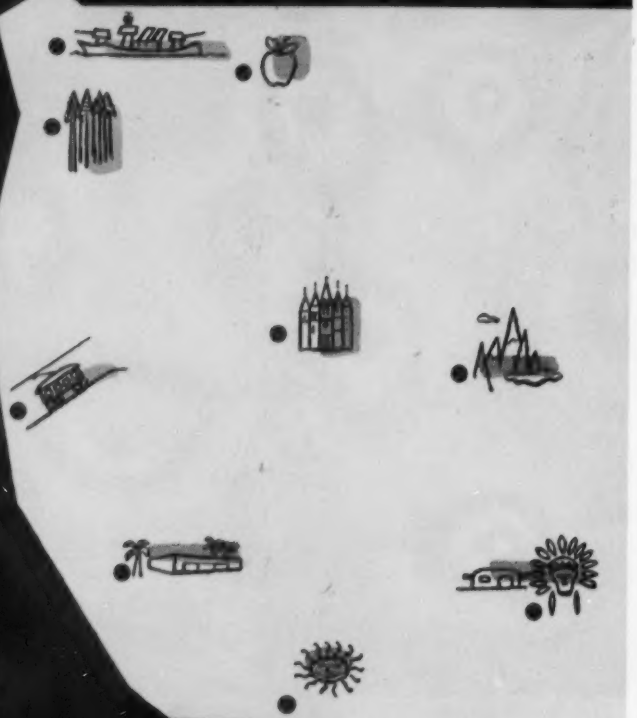
No. 926 TEMPERATURE REGULATOR—safety type for engines, process control, etc.

No. 992-D BELLOWS CONTROL VALVE—for use with Fultrol Pilot Controller, etc.

No. 992 PRESSURE REGULATOR

Nos. 1280 & 1281 TEMPERATURE REGULATORS—for engines, process water, etc.

No. 1620 FLOAT VALVE—for liquid level control.



Process unit, pilot plant, laboratory, or washroom—Fulton Sylphon has the right solution to your temperature regulator problems—a solution that gives you two exclusive advantages at no extra cost.

UNMATCHED SERVICE—Fulton Sylphon service can save you headaches and money. It's the kind of competent, responsible engineering advice and follow-through that only more than 50 years' experience can make possible. What's more, a nationwide network of Fulton Sylphon offices makes this engineering service available practically in your backyard.

THE RIGHT REGULATOR—The widest line of temperature regulators anywhere assures you of the right control at lowest cost. No matter which regulator is best for you, you can be sure of the same dependable performance. Fulton Sylphon itself makes all components, and is acknowledged to be the leader in bellows—the heart of every Sylphon regulator.

HEADQUARTERS, U. S. A.

Send for this today!

This catalog gives complete features, data, dimensions, and specifications for Fulton Sylphon temperature regulators.

Mr. Controls

Robertshaw-Fulton

CONTROLS COMPANY

FULTON SYLPHON DIVISION

Knoxville 1, Tenn.

Robertshaw-Fulton Controls Co.
FULTON SYLPHON DIVISION
Knoxville 1, Tenn.

Please send me Catalog D—GG

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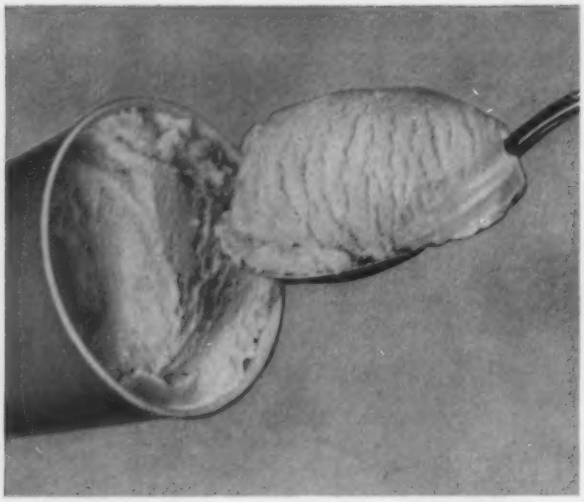
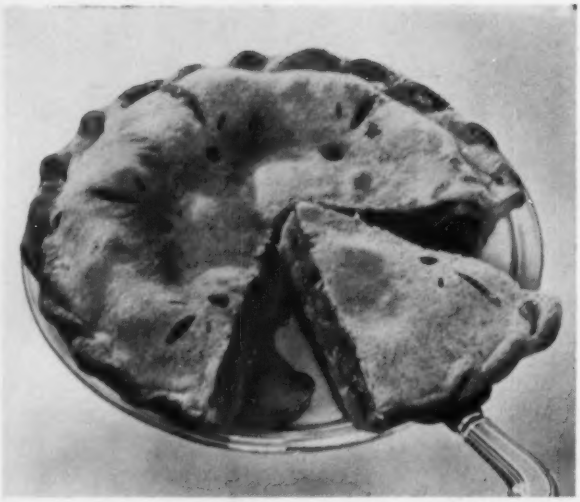


In the manufacture of ice cream the superior uniformity, purity and clarity of Globe and Rex® brand corn syrups aids the development of smooth, uniform textures which promote true flavors, assure quality ice cream.



Important factors in pie fillings are the natural sparkle, color and flavor of the fruit. Uniformly pure and clear, Rex or Globe® brand corn syrups retain these important characteristics, assure greater eye and taste appeal.

Maintain constant high product standards by utilizing the superior uniformity, clarity and sparkle of

GLOBE® AND REX®
CORN SYRUPS

A COMPLETE RANGE, TAILORED TO MEET YOUR MOST EXACTING SPECIFICATIONS

As a "doctor" in confectionery making, Globe brand corn syrups are without peer in wholesomeness, clarity and efficiency. With a minimum of inverting power, Globe syrups promote better grain control, better deposit in the mogul, longer shelf life.

Globe and Rex brand corn syrups bring out the true color and flavor of processed foods. Uniformly clear and sparkling, and available in a complete range, Globe and Rex corn syrups help you maintain constant high product standards.

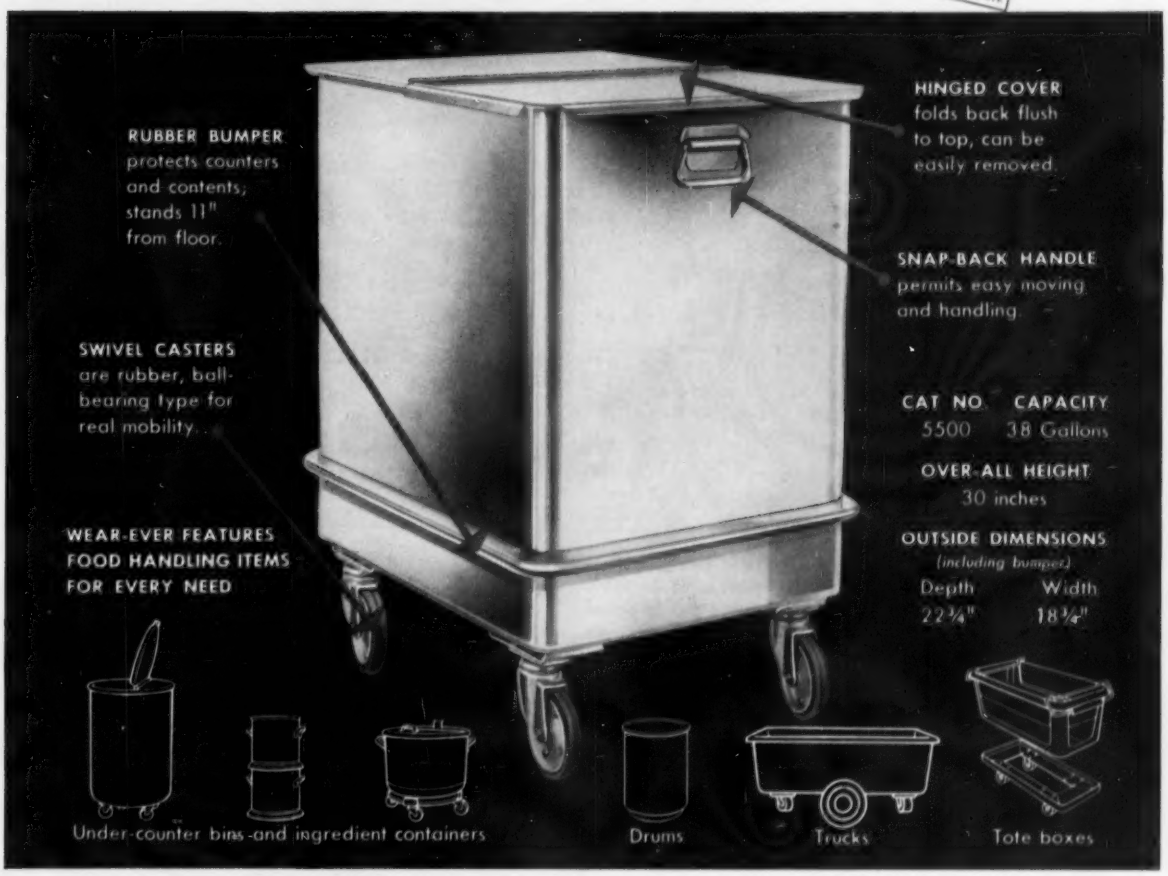
Our technical staff welcomes the opportunity to help you develop improved formulas through use of Corn Syrups. Call us today.

1906 • 50th ANNIVERSARY • 1956
CORN PRODUCTS REFINING COMPANY
17 Battery Place, New York 4, N. Y.

... now ... 33-1/3% more capacity ...

in this new rectangular, mobile under-counter type

BIN
by WEAR·EVER



We've "squared away" the conventional round container, to give you ⅓ *more* carrying and storing capacity, *in comparable over-all size.* Think what this can mean to you in faster handling, fewer refills, greater utility.

Quality's the same, of course, as in all Wear-Ever Aluminum food handling items. Extra hard-wrought dent and scratch resistant alloy. Seamless construction. Smoothly rounded, easy-to-clean inside corners. Sanitary flared rim.

Naturally, we've designed this new container for a perfect fit under your standard cook's and baker's work tables —same as the round type.

Like to see a sample? Pick up the phone and ask your Wear-Ever man to wheel one over. Or send coupon for full details on our complete food handling line.

WEAR·EVER ALUMINUM UTENSILS

THE ALUMINUM COOKING UTENSIL COMPANY, INC.
WEAR-EVER BLDG., NEW KENSINGTON, PENNSYLVANIA

The Aluminum Cooking Utensil Company, Inc.
304 Wear-Ever Building, New Kensington, Pa.

GENTLEMEN: *I'd like to know more about your new rectangular under-counter bin.*

☐ Send me your catalog. ☐ Have your representative see me.

NAME .....

TITLE .....

Fill in, clip to your letterhead, and mail today.

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SK apades in industry

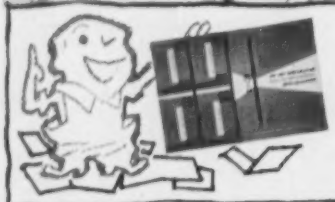
THE CASE OF THE PERIODIC PUMPING PROBLEM AND THE PATIENT PLANT ENGINEER

"... ub glub bedubtub
(this situation's becoming impossible)," glubbled Barney, the patient plant engineer.

"Ub tub ud ub tub ud ub tub
(I've tried and I've tried and I've tried)," bubbled Shorty, his faithful, conscientious assistant,
"Bud dub pubs wud hubtub dub slubb
(But the pumps won't handle the sludge)—it ruins them every time."

"Wub, subtub's *gub* tub bub dub
(Well, something's *got* to be done)," answered Barney. "Or, *I'll* lose my *patience* AND YOU'LL LOSE ... well, you'll be an *ex-faithful, ex-conscientious* assistant plant engineer."

With that, Shorty stubbled away ... in the direction of his office and catalog files.

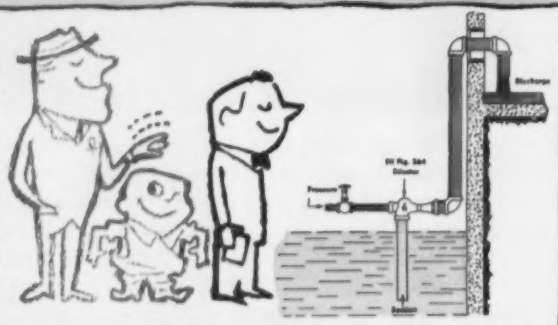


"I've got it," shouted Barney. "It says either an SK Jet Eductor or Syphon is good for pumping liquids where solids or semi-solids must pass through the apparatus and is ideal for use where pumping is periodic."

So he called in his nearest SK Sales Engineer who made an on-the-spot survey of the situation and, because of certain special considerations, recommended the use of an SK Fig. 264 Water Jet Eductor.

PATIENCE REWARDED

It paid to be patient. Now, the recurring drainage problem has been solved, simply and inexpensively. The SK Fig. 264 Water Jet Eductor uses pressure liquid, entering the eductor through a nozzle, to create a vacuum in the line which causes the suction liquid to flow up into the body of the eductor where it is entrained and discharged. Solids and semi-solids present no problem. Since there are no moving parts and the eductor is self-priming, the jet is ready to operate when required.



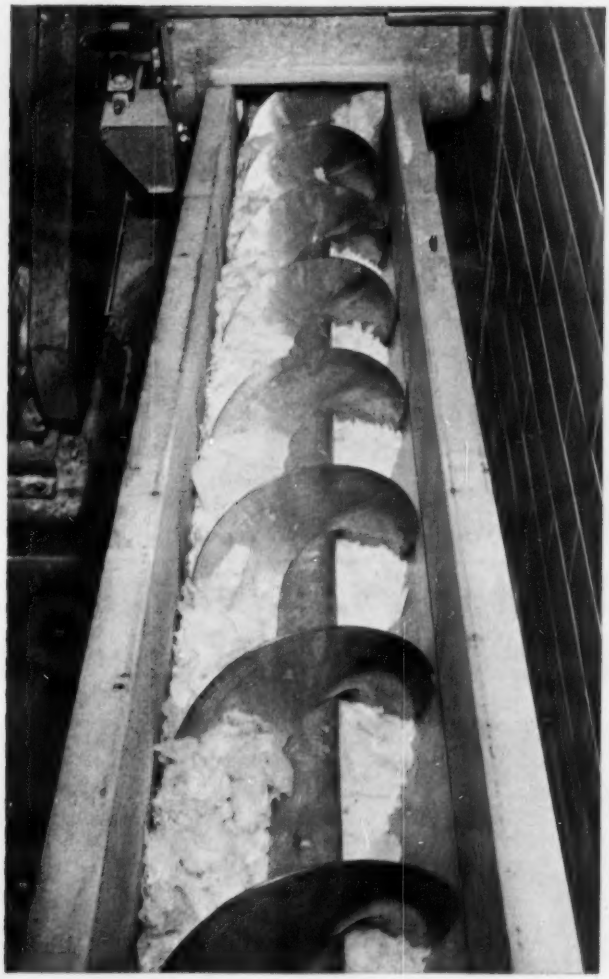
MORAL:

Get acquainted with all types of SK Jet Apparatus. Send for a copy of Condensed Bulletin J-1. Make use of a qualified specialist, your nearest SK Sales Engineer.

Schutte and Koerting
COMPANY
MANUFACTURING ENGINEERS
2223 STATE ROAD, CORNWELLS HEIGHTS, BUCKS COUNTY, PA.

JET APPARATUS: Ask for Condensed Bulletin J-1.
ROTAMETERS & FLOW INDICATORS: Ask for Condensed Bulletin TR-RA.
VALVES: Ask for Condensed Bulletin V-1.
HEAT TRANSFER APPARATUS: Ask for Condensed Bulletin HT-1.
GEAR PUMPS: Ask for Bulletin 17-A.

LINK-BELT offers you
COMPLETE, ONE-SOURCE SERVICE
for all your screw conveyor needs



Spotless, galvanized screw conveyor (cover removed) provides efficient, sanitary means of carrying flaked, edible material to bucket elevator and further processing.

How this 4-phase service saves you time . . . spares you details

1. **ANALYSIS AND ENGINEERING** service is provided by a district sales office in your area. From long experience, Link-Belt District Engineers can quickly ascertain the best conveying arrangement for you.

2. **COMPLETE LINE OF SCREW CONVEYOR COMPONENTS** and related elevating, conveying and power transmission equipment is your assurance that specific needs will be fulfilled most efficiently and economically.

3. **EASY ERECTION** is achieved because of prefitting, match marking, close-tolerance manufacturing and Link-Belt drawings. Link-Belt will handle entire erection assignment if you wish.

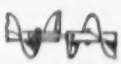
4. **SATISFACTORY PERFORMANCE** is assured when you rely on Link-Belt as a single contract source for your complete system. We will accept full responsibility for placing it in operating readiness.

SCREWS

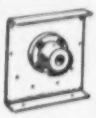
HANGERS

TROUGHS

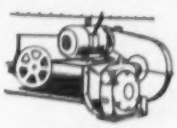
SPOUTS & GATES



SHAFTS & COUPLINGS



TROUGH ENDS



DRIVES

Here's a four-point program that provides quick and easy answers to your screw conveyor problems whether minor or complex. Whatever you need in components . . . and to whatever extent you require engineering supervision—Link-Belt will devise a system "tailored" to your requirements, correlating all factors to assure you of finest performance. For more facts, call your nearby Link-Belt office.

LINK-BELT

SCREW CONVEYOR EQUIPMENT

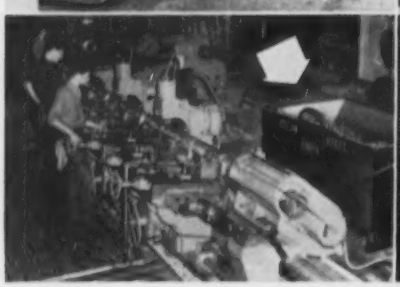
LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

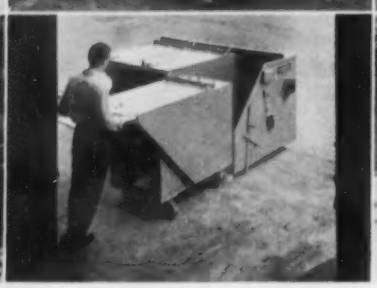
13.013-A

For more data, circle this page number on card at back →

Here's the most versatile....lowest cost of bulk materials handling by truck ever

With only one man, it PICKS UP . . . HAULS . . . Serves scores of big steel containers, all sizes and





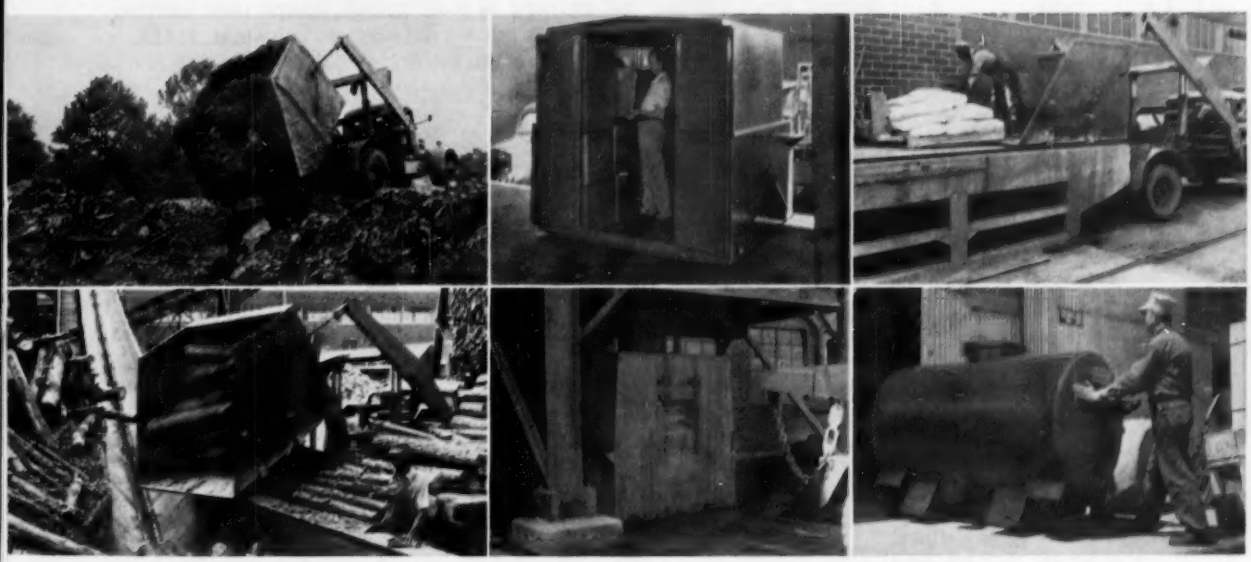
It's the DEMPSTER DUMPSTER® System

ABOVE ARE BUT A FEW of the hundreds of different Dempster-Dumpster Detachable Containers at work in industry today—containers built in capacities up to 21 cu. yds. . . . several times the capacity of the average dump truck body. It's like having one truck with scores of bodies!

method devised!

Here's MASS-HANDLING of bulk materials with one truck . . . one man! Multiply this simple pick up, haul and dump operation by scores of steel containers built to meet your requirements for handling waste or salvable materials, raw and finished products, fluids, including acids, combustibles, dusty materials, etc. No other method handles waste and bulky materials so cheaply!

and DUMPS (or sets load down intact) designs — handling materials of every description



WITH NO OBLIGATION on your part, our engineers will be glad to make a comprehensive fact-finding survey to determine the cost-cutting possibilities of this equipment in your plant. Ask us for complete information. Manufactured exclusively by Dempster Brothers, Inc.

5205

DEMPSTER BROTHERS

746 Shea Bldg., Knoxville 17, Tennessee

BELIEVE IT OR NOTS IN INDUSTRIAL COATINGS

NEW PAINT FROM PETROLEUM SURPASSES ANYTHING KNOWN IN ADHESION, ACID AND ALKALI RESISTANCE- AND FILM STRENGTH

SURFACES NEVER BEFORE PAINTABLE CAN NOW BE GIVEN A PROTECTIVE COATING OF BEAUTY AND COLOR; SURFACES EXPOSED TO ALKALIS AND ACIDS CAN NOW BE PROTECTED FOR YEARS. ADHESION AND FILM TOUGHNESS ARE SO GREAT YOU MUST SEE TO BELIEVE. NAME OF THE NEW PRODUCT IS EPO-LUX

STEELCOTE PRODUCTS CONTRIBUTE TO LONGER LASTING, LOWER COST SURFACE MAINTENANCE IN HOMES AND INDUSTRIAL PLANTS THROUGHOUT THE WORLD. IF YOU HAVE A SPECIAL PROBLEM OR WANT TO REDUCE COSTS OF PRESENT SURFACE MAINTENANCE, CONSULT THE STEELCOTE ENGINEERING DEPARTMENT.

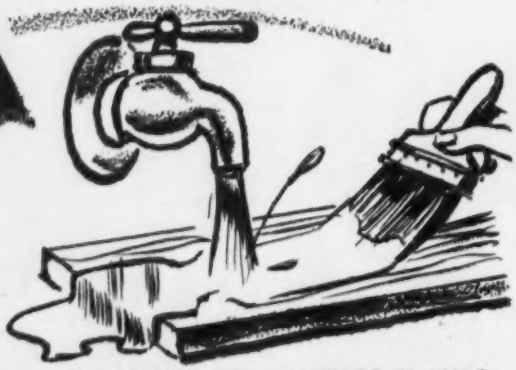
NEW FLOOR ENAMEL CAN BE WALKED ON IN 30 MINUTES

OFFICES, SHOWROOMS, CORRIDORS, STEPS, AND MACHINERY CAN BE GIVEN LIKE-NEW LOOKS AND EVERYTHING IS DRY IN 30 MINUTES. THE SAVINGS IN TIME ALONE MAKES LONG LASTING, TOUGH FILM QUICK-X THE MOST ECONOMICAL FLOOR FINISH ENAMEL ON THE AMERICAN MARKET

NO NEED TO REMOVE RUST TO PAINT

HALTS-RUST GOES RIGHT OVER RUST, A FILM OF OIL SURROUNDS EACH RUST PARTICLE, KEEPS IT NEUTRALIZED WHILE SURFACE OF HALTS-RUST HARDENS INTO A BEAUTIFUL ENAMEL FINISH.

PAINT GOES ON WET SURFACES



IT PERMITS THE MOISTURE TO LEAVE- THEN IT DRIES INTO A HARD, PORCELAIN-LIKE FILM, SEALING OUT MOISTURE THEREAFTER. FOR COOLER, FOOD AND DRINK PROCESSING ROOMS. THE NAME IS DAMP-TEX.

Offices, Distributors in Principal Cities.

Write our Dept. FE about your problems

There Are More Than 100 Products Made By

Steelcote

3418 Gratiot St. Louis 3, Mo.

DEPENDABLE COLORS
for Discriminating Buyers

- Unlimited production facilities
- Complete technical service

- Accurate blending
- Nationwide distribution

Write us for Prices and Detailed Information.

U.S.P. Vitamins in bulk

Also available in carriers for easy, accurate and economical fortification of foods.

• • •

Roccal—the original quaternary ammonium sanitizing agent.

Sterwin Chemicals INC.

SUBSIDIARY OF STERLING DRUG INC.

1450 BROADWAY, NEW YORK 18, N. Y.
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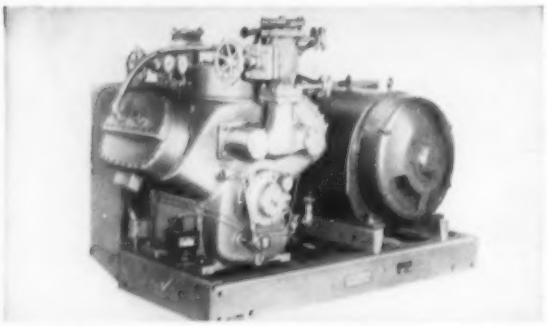
WORLD'S LARGEST SUPPLIERS OF VANILLIN

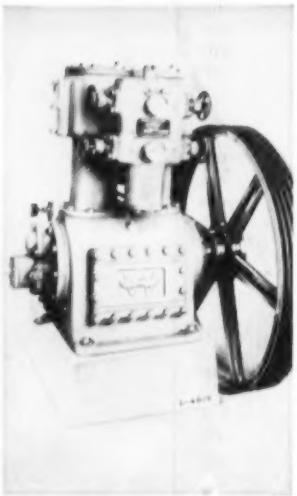
Butcher...Baker...Frozen Food Maker?

Worthington makes the right size of ammonia compressor to refrigerate your product

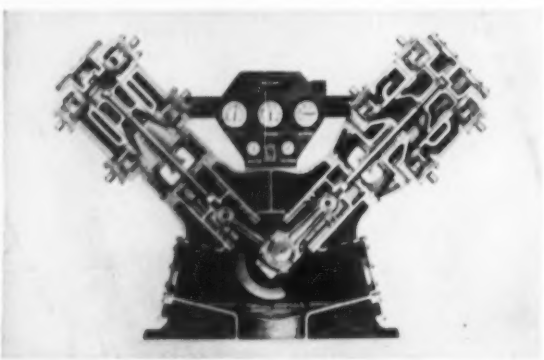
No matter what type of food processing you do . . . how big the capacity of your plant . . . or how limited the floor space, there's a Worthington ammonia compressor to fit your refrigeration needs *exactly*. Worthington Corporation, Air Conditioning and Refrigeration Division, Sect. A.5.63-FE. Harrison, N.J.



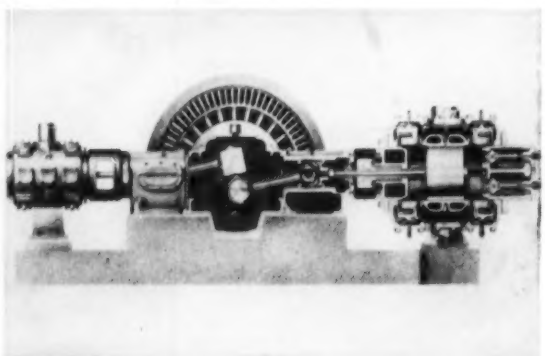
TYPE V-W HIGH-SPEED AMMONIA COMPRESSORS come with 4 and 6 cylinders in capacities from 18 to 150 tons. These lightweight, compact units can be used as high stage or booster machines. Features include famous Feather Valves® for economical operation, self-priming oil pump, balanced lightweight automotive-type pistons, cylinder liners and automatic-unload start and stop capacity control. Efficient, dependable V-W compressors are built for rugged service and long life.



VERTICAL AMMONIA COMPRESSORS (TYPE VSA) are built in capacities from 3 to 150 tons, sizes from 3 in. x 3 in. to 10 in. x 10 in. Features include patented Feather Valves on suction and discharge — lightest, tightest ever made; water jacketed cylinders, forged steel crankshafts and connecting rods; full force-feed lubrication (5 in. x 5 in. and larger).



"Y" AMMONIA COMPRESSORS are constructed for heavy duty and long, uninterrupted service. Large capacity sizes (from 60 to 460 tons) require minimum floor space — an important feature where processing machinery is concerned. For most applications, a flanged mounted motor can be used, eliminating separate motor foundation. "Y" compressors available for single or two-stage operation.



BDC COMPRESSORS are the newest addition to the line. True balanced-opposed design permits smaller, more compact foundations. Cylinders — up to four pairs — are located on opposite sides of a rugged, stable frame and powered by a double-throw crankshaft. Design is ideally suited to large multi-service or multi-stage compression requirements. Ratings from 300 to 10,000 hp.

A 5 63

WORTHINGTON

CLIMATE ENGINEERS TO INDUSTRY, BUSINESS AND THE HOME

Clarity Measurements in Filtration

by Paul W. Leppla, *Technical Director*

Filtration efficiency is usually measured in terms of flowrate and clarity. Flowrate is readily measured in most plants; however, clarity measurements involve the most difficult aspects of filtration technology. Consequently most industries rely upon visual evaluation of filtrate clarity, which is only semi-quantitative at best and occasionally is purely subjective.

Critical evaluation of filtrate clarity requires instrumental measurement. A number of satisfactory instruments of U.S. manufacture are available. Some measure transmitted light, a questionable technique since few of these instruments discriminate between bleaching of soluble color and the removal of suspended particulates. The measurement of Tyndall or scattered light is much preferred.

Too, the problem of absolute standards is not yet resolved, resulting in confusion on clarity measurements from one laboratory to another. One instrument company has available a series of calibrated standards, which are claimed to be stable, and at least one technical society is working on the development of absolute reference standards so that identical measurements will be possible in different laboratories.

Under these circumstances, evaluating a series of diatomite filteraids is extremely difficult. While Filteraid A may have 90% of the clarification efficiency of Filteraid B in a raw sugar solution, the relative rating in a pectin system may be only 60%. Moreover, the relative clarification of two filteraids with respect to the same liquid may change markedly depending upon the conditions of the test.

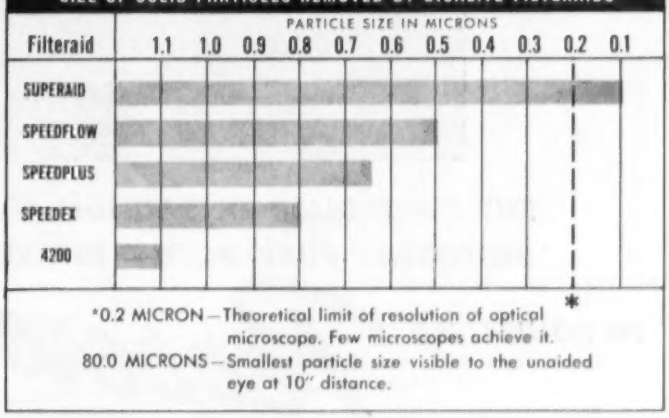
Because of the many variables involved which can influence results to an enormous degree, it is imperative that comparative tests duplicate, as nearly as possible, actual plant conditions. Since often this is difficult, many plants rely on the wealth of experience available to them from a leading supplier in this extremely complex field, experience covering many types of liquors, filters and operating conditions.

The chart in the accompanying advertisement illustrates a significant step forward in this difficult field recently achieved in the Dicalite laboratory. While it is possible to calculate the average pore size of a filter cake, our scientists have known for some time that particles much smaller than the calculated pore diameter are readily retained by diatomite filteraids. By carefully preparing suspensions of uniformly sized particles in the 1-10 micron range, and conducting laboratory filtration tests under carefully controlled conditions, they were able to determine exactly what size particles can be removed by each of the grades of Dicalite filteraids.

We believe that this type of information, never before published, is important to you, as a user of filteraids.

...With a DICALITE Filteraid you can filter out particles so small you can't see them with a microscope!

SIZE OF SOLID PARTICLES REMOVED BY DICALITE FILTERAIDS



*0.2 MICRON—Theoretical limit of resolution of optical microscope. Few microscopes achieve it.

80.0 MICRONS—Smallest particle size visible to the unaided eye at 10" distance.

These figures, established in recent Dicalite laboratory tests, are, we believe, the first *accurate* figures ever published on the actual sizes of solids removed by different grades of diatomaceous filteraids. And the dependable uniformity of Dicalite filteraids, in all grades, assures you the same reliable performance, filter run after filter run, on all types of particulates, even gelatinous or slimy. The significance of these figures in pointing the way to the development of maximum filteraid performance can hardly be over-stated. They are one more evidence of Dicalite's leadership in the field of filteraids.

For more complete information on the application of Dicalite Filteraids to your processing problem, write

We Progress thru Service

Dependable GLC GREAT LAKES Dicalite® DIATOMACEOUS MATERIALS

DICALITE DIVISION • GREAT LAKES CARBON CORPORATION
612 SOUTH FLOWER STREET, LOS ANGELES 17, CALIFORNIA

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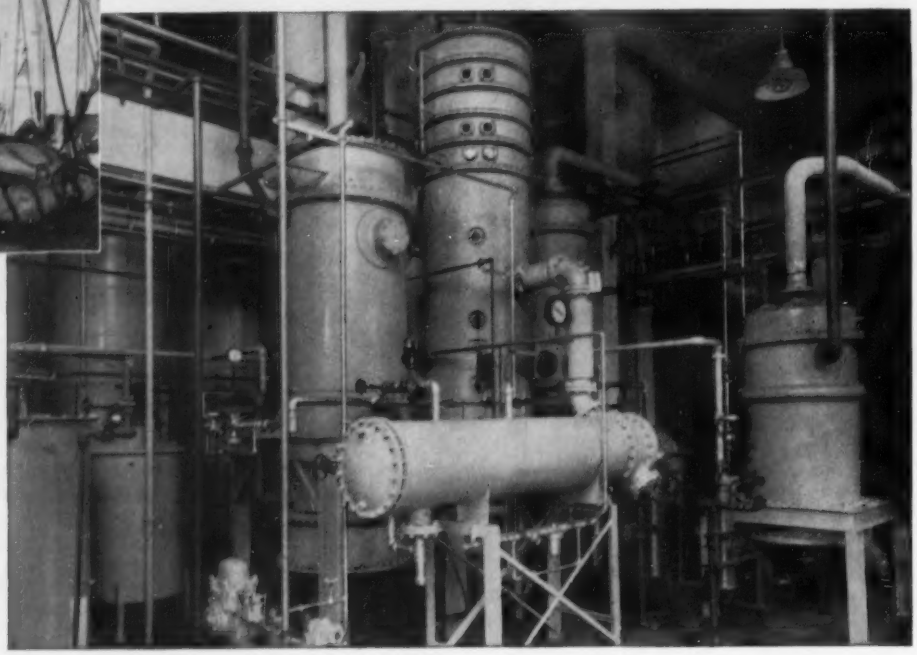
Spice Shipments are not always the same...



BUT CONTROLLED EXTRACTION ASSURES UNIFORMLY PURE, POTENT PEPPER FLAVOR IN SOLUBLIZED Pepperoyal®

Pepperoyal is no ordinary soluble pepper. Use the same amount of Pepperoyal in every batch of your product, and every batch will smack of the same pure pepper flavor.

True, it is processed from prime quality pepper berries. But, its real quality distinction originates in the Griffith laboratories. The potency, purity and uniformity of pepper flavor in Pepperoyal is controlled by our exclusive process of extraction.* It assures you of the same flavor quality in every shipment of Pepperoyal, or any of Griffith's Solublized Seasonings.

A real contribution to the flavor control of your products! Let's talk about it.

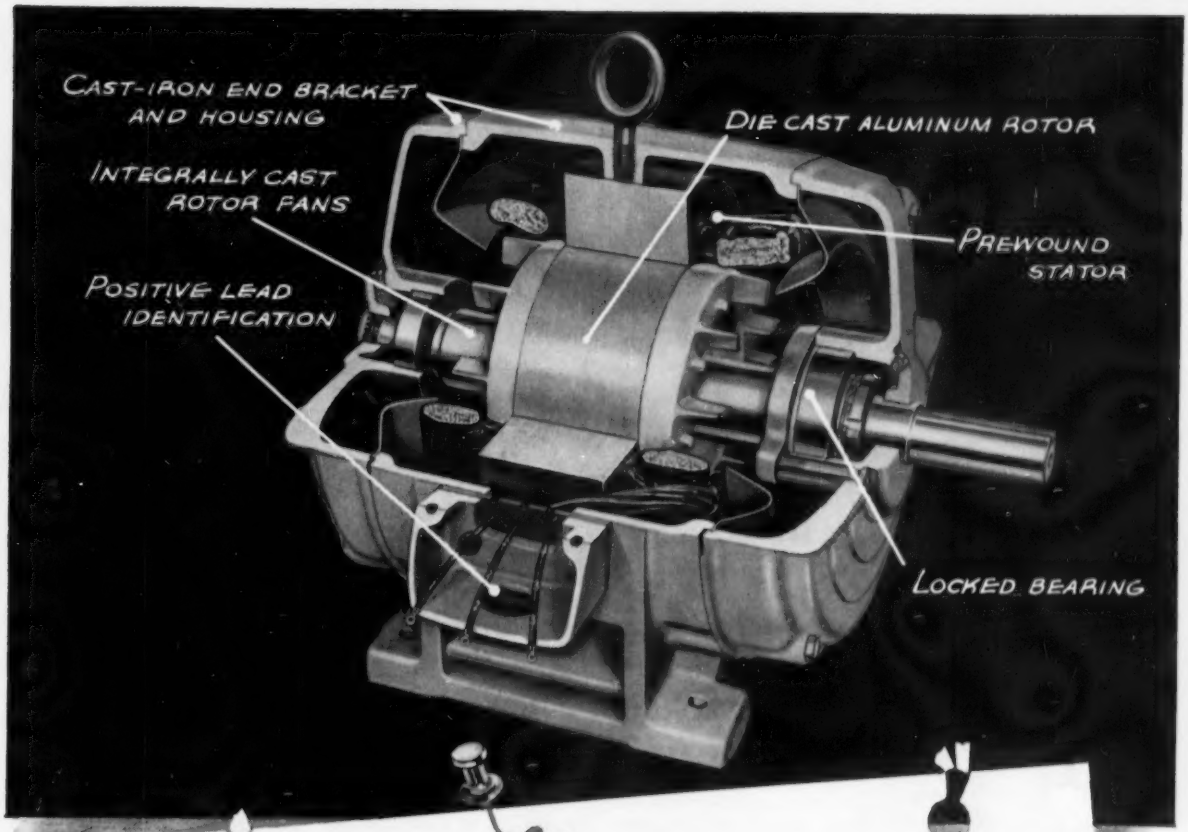
*Patent Applied For.

THE Griffith LABORATORIES, INC.

In Canada — The Griffith Laboratories, Ltd.

CHICAGO 9, 1415 W. 37th St. • NEWARK 5, 37 Empire St. • LOS ANGELES 58, 4900 Gifford Ave. • TORONTO 2, 115 George St.

Laboratorios Griffith do Brasil, S.A.—Caixa Postal 300 Mogi das Cruzes, Est. S. P., Brasil



Are you getting all these extras in the motors you buy?

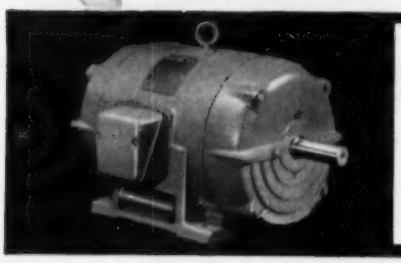
Louis Allis gives them to you, because they build their standard motors with special care

For years, Louis Allis has specialized in special motors for many of industry's toughest drive problems. Such installations call for extreme care in both motor design and manufacture—care that has become a habit with us. That's why we build our standard motors with special care.

What does this mean to you? It means that you get a motor with extra features —a motor that runs better, lasts longer. Here are a few of the extra reasons why:

- New exclusive phenolic impregnating varnish provides high thermal and chemical resistance. It remains resilient and resists aging for longer motor life.
- Locked bearings, inner race to shaft, outer race to end bracket, reduce end play and increase bearing life.
- Increased protection not only for the motor, but also for operating personnel. Double end ventilation permits maximum end bracket enclosure—prevents foreign matter from entering motor.
- Quiet operation obtained by careful design and test. Close manufacturing tolerances assure perfect alignment and minimum electrical noise.

There are many other features such as cast iron construction, positive lead identification, split conduit box—but our new bulletin No. 1700 describes all the many extras you get in a Louis Allis standard motor. Write for your copy.



A complete line of standard rerated motors in frames 182 through 326U now in stock. Special rerated motors are available on short delivery.

LA-108

THE LOUIS ALLIS CO.
MILWAUKEE 7, WISCONSIN

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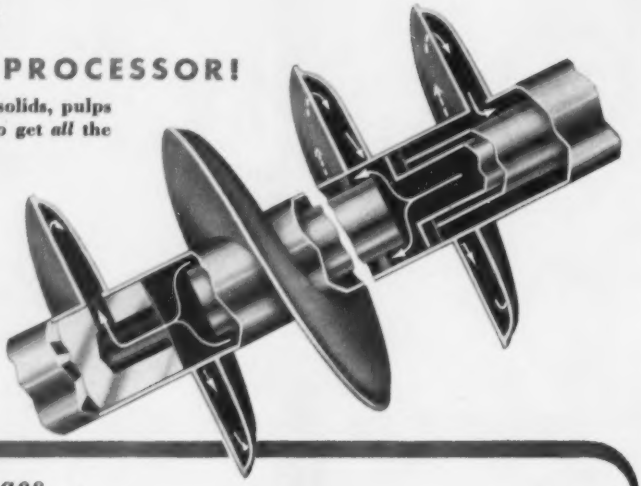
if you have a Cooling . . . Heating . . . or Drying problem

investigate the revolutionary advantages of . . .

THE holo-flite* PROCESSOR!

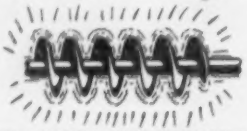
If you have processes where slurries, granular solids, pulps or pastes are cooled, heated or dried, be sure to get *all* the facts on HOLO-FLITE advantages.

HOLO-FLITE handles such processes — *in continuous flow* — in as little as 1/5th the space of other types of heat exchangers. What's more, it is readily adaptable to a wide range of applications — is simple to install and maintain — and provides many other important savings.

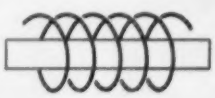


typical HOLO-FLITE *advantages . . .*

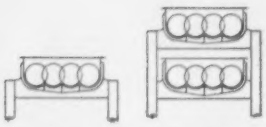
ITS APPLICATION FLEXIBILITY is almost unlimited. It cools, heats, or dries. It handles granular solids, pulps, pastes, slurries and fluids with equal ease. Its heat transfer agent can be water, refrigerant, hot oil, Dowtherm, steam or other liquids or vapors at any of a wide range of temperatures. It cools materials in ranges from 1800°F to 0°F. It heats and dries with hot oil to 600°F . . . with Dowtherm to 750°F . . . with steam to 150 lbs. per sq. in. pressure.



THE LARGE HEAT-TRANSFER SURFACE saves space — HOLO-FLITE requires as little as 1/5th the space of other heat-exchange equipment of comparable capacity. Moreover, a more complete heat transfer is effected, resulting in more uniform processing.



ROTATION IS SLOW — granular and powdered solids are handled with practically no dusting — negligible abrasion. There are no dust recovery problems — a further saving in installation, maintenance and operating costs!



ITS OPERATING CAPACITY is readily adaptable to virtually any requirements by simply varying the diameter, pitch, and length of flights, as well as the number of "tiers." Multi-tier units require no more floor space than single-tier installations!

HOW HOLO-FLITE WORKS . . .

Basically the HOLO-FLITE consists of one or more flights of hollow-bladed screw conveyors. The product to be processed moves through a trough housing the conveyor screws. The heat-transfer fluid circulates through the hollow blades and shafts of the conveyor. The product is constantly rotated into, around, under and over the blades and shafts through which the heat-transfer fluid is circulating, assuring quick, uniform heat passage between the two mediums — *as the product is continuously moved along in a bulk-flow without interruptions!*

GET THE COMPLETE FACTS on Holo-Flite savings and how this field-proven unit can save space, time and money on your processing operations. This eight-page descriptive bulletin will gladly be sent on request. No obligation, of course!

WESTERN Precipitation CORPORATION

DESIGNERS AND MANUFACTURERS OF EQUIPMENT FOR COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

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* T.M. Reg. (Hollow-Flite)

Powell Lubricated Plug Valves

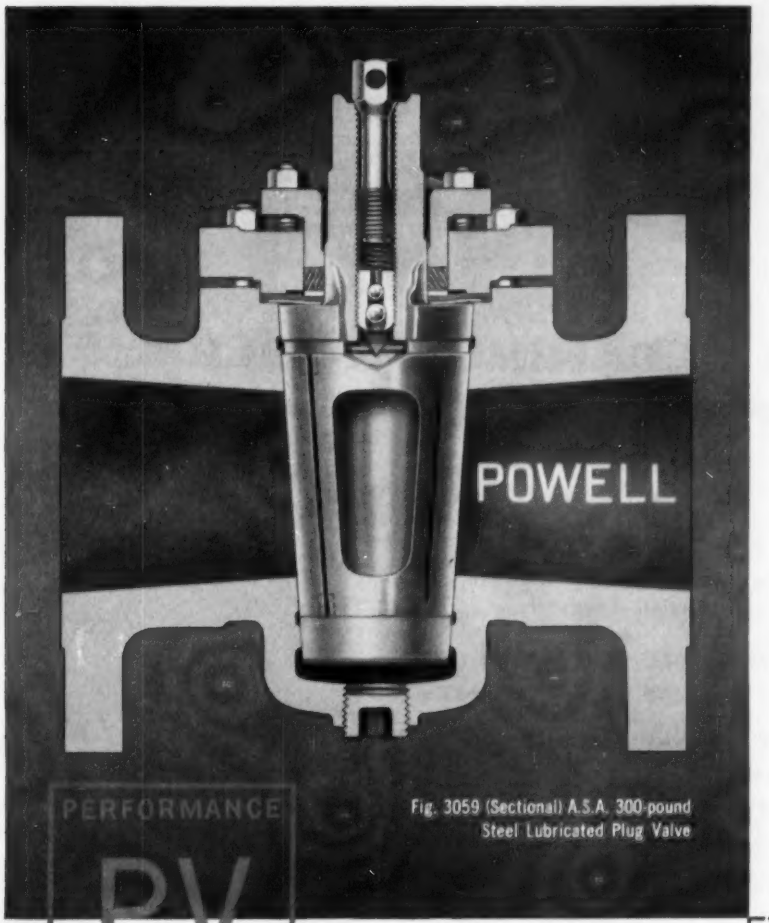


Fig. 3059 (Sectional) A.S.A. 300-pound Steel Lubricated Plug Valve

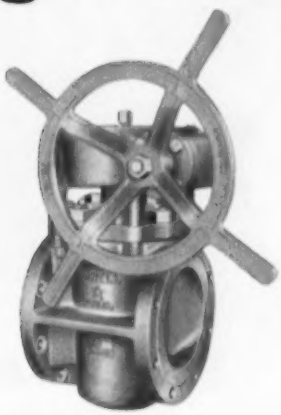


FIG. 1559G—150-pound Steel Lubricated Plug Valve. Gear operated

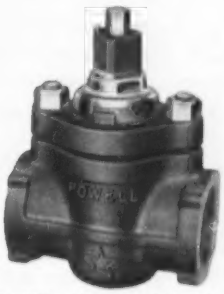


FIG. 2200—175-pound W.O.G. Semi-Steel Lubricated Plug Valve

Powell Lubricated Plug Valves maintain the 110-year tradition of quality and precision. Only the finest available materials are used. And painstaking quality control is rigidly enforced through each and every step of manufacture.

Valve users who want one source of supply for lubricated plug as well as all types of bronze, iron, steel and corrosion-resistant valves will want full details on Powell Lubricated Plug Valves.

For example, features include quick and positive operation—just a quarter-turn to open or close. Lubricant grooves surrounding each port provide a positive seal when the valve is closed. In an open position, seating surfaces are not exposed. Available in Steel and Semi-Steel through distributors in principal cities.

For full details, write for the new PV-4 Catalog on Powell Lubricated Plug Valves. Just fill out the coupon and mail. Of course there's no charge, no obligation.

THE WM. POWELL COMPANY
2525 Spring Grove Ave.
Cincinnati 22, Ohio

Gentlemen:

Please send me a copy of your PV-4 Catalog on Powell Lubricated Plug Valves. It is understood that there is no cost, no obligation.

*name*_____

*title*_____

*company*_____

*city*_____

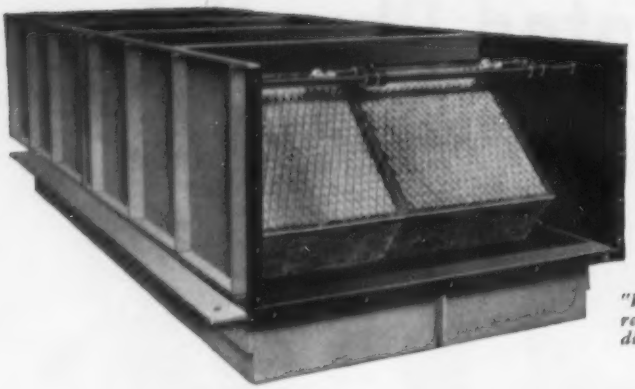
*zone*_____ *state*_____

The source of supply for all valve needs!

POWELL VALVES...110th YEAR

BRONZE, IRON, STEEL AND CORROSION RESISTANT VALVES.

For more data, circle this page number on card at back →



"Buffalo" Absorption Type Washer for removal and recovery of soluble gases, vapors, and mists before discharge into the atmosphere.

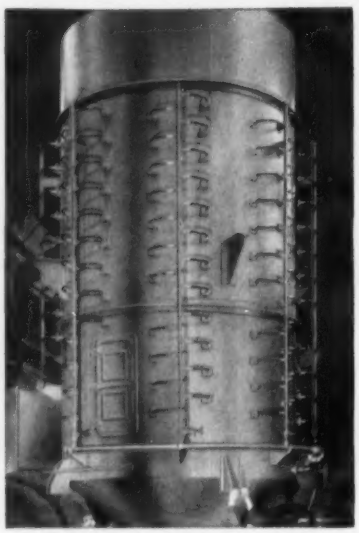
YOUR AIR CLEANING PROBLEM IS OUR SPECIALTY!

Here at Buffalo Forge Company, we have been clearing up industrial effluents since the earliest days of air cleaning. Many of the pioneer units — "Buffalo" Air Washers — are still on the job after nearly sixty years. Most cleaning problems require the special engineering knowledge and equipment which "Buffalo" has developed over all these years.

"BUFFALO" KNOW-HOW AND EQUIPMENT HAVE CLEARED UP THESE EFFLUENTS

coke breeze • 1000° corrosive gases
SO_2 or SO_3 process gases (recovered)
heavy dusts • rock dusts • electric furnace fumes
tar vapor • lampblack • metallic fumes
soluble gases, vapors, mists

"Buffalo" builds units for practically every type of nuisance or pollution problem — Air Washers, Hydraulic Scrubbing Towers, Hydro-Volute Scrubbers, Rotary Gas Scrubbers, Gas Absorbers, Exhausters and Pumps — all engineered for the job and thoroughly proven. Your nearby "Buffalo" Air Engineer is ready to give you competent recommendations.



"Buffalo" Hydraulic Scrubbing Tower for high efficiency removal of corrosive, high temperature or stringy materials which ordinary units cannot handle.

WRITE FOR BULLETINS AP-225, AP-425, AP-525, 3181-B and 2424-F.

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"Buffalo" SALES ENGINEER AIR CLEANING

BUFFALO FORGE COMPANY

BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

Three food plant lube problems STANOIL Industrial Oil can help you whip

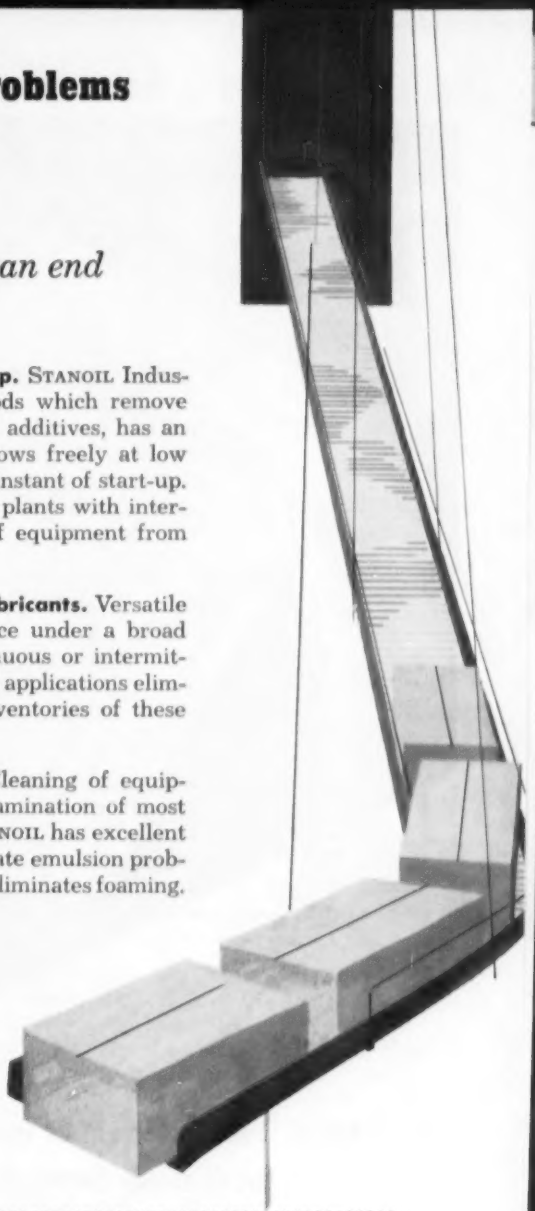
big maintenance headaches can end with switch to STANOIL

1. Poor flow of lubricant on cold start-up. STANOIL Industrial Oil, due to selective refining methods which remove waxy constituents and the use of special additives, has an exceptionally low pour point. STANOIL flows freely at low temperatures, is ready to lubricate at the instant of start-up. Candy, bakery and other food processing plants with intermittent production get full lubrication of equipment from start to stop.

2. Large inventory of special purpose lubricants. Versatile STANOIL gives top lubrication performance under a broad range of conditions...heat or cold, continuous or intermittent, high pressures and low. One oil for all applications eliminates special purpose oils, eliminates inventories of these oils, eliminates application mistakes.

3. Water contamination of lubricant. Cleaning of equipment and condensation mean water contamination of most oils with resulting water-oil emulsion. STANOIL has excellent demulsibility, is specially refined to eliminate emulsion problems, contains an additive which virtually eliminates foaming.

Check with your Standard Oil industrial lubrication specialist about converting your plant to STANOIL. There is one of these Standard men near you in any of the 15 Midwest and Rocky Mountain states. Call him or write Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Illinois.

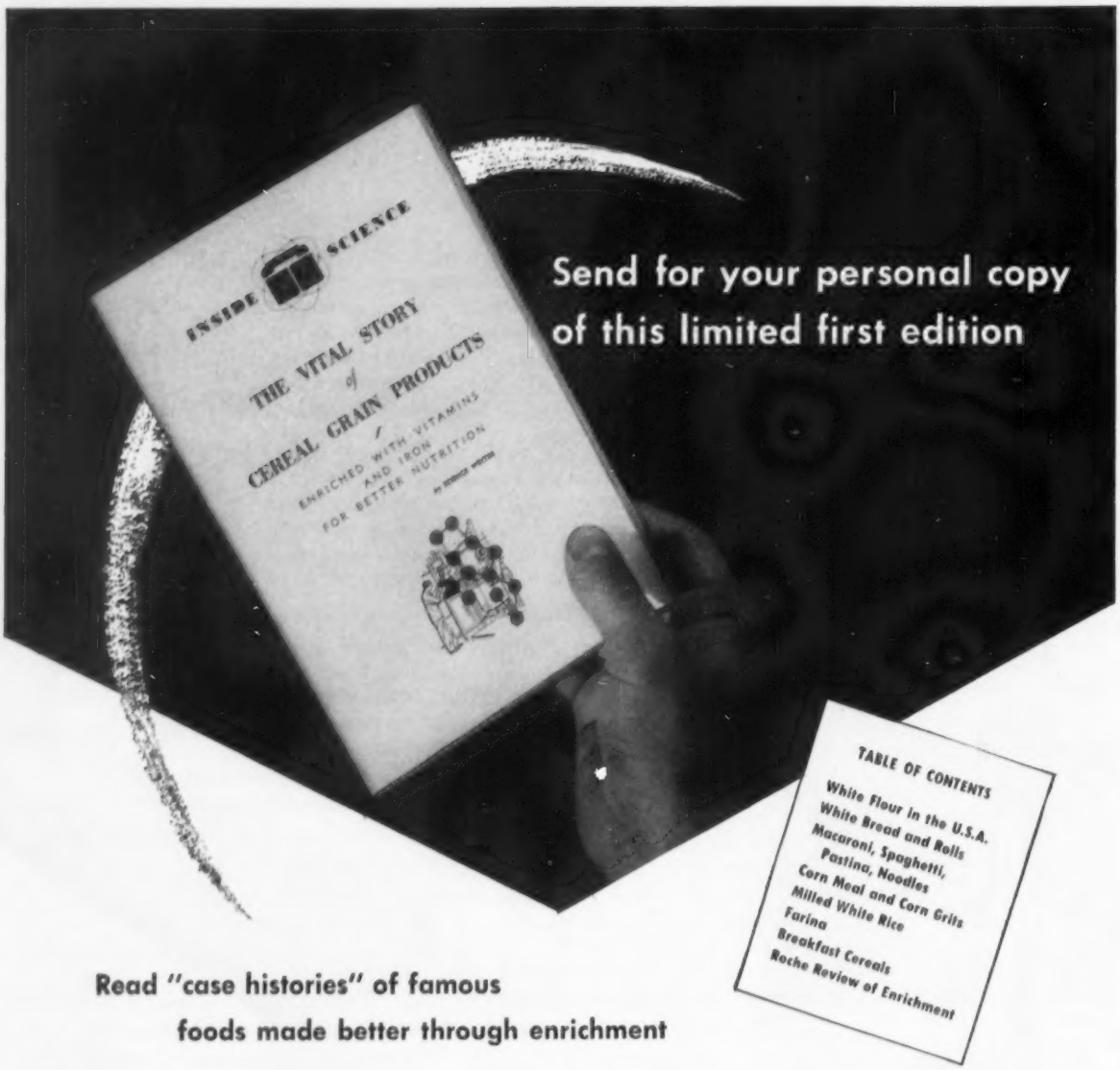


Quick Facts About STANOIL Industrial Oil

- **Stability.** STANOIL's antioxidant gives oil resistance to chemical change, minimizes deposits.
- **Rust Prevention.** Inhibitor in STANOIL "plates out" on metal surfaces, prevents corrosion.
- **Cold Starts.** STANOIL has low pour point. Flows freely from cold start. No need for costly warm ups.
- **Resists Effects of Temperature Change.** STANOIL has high viscosity index, is resistant to change in both high and low temperature service.
- **Excellent Demulsibility.** STANOIL is refined to eliminate emulsion problems, contains additive to minimize foaming.

STANDARD OIL COMPANY
(Indiana)

STANDARD



Read "case histories" of famous foods made better through enrichment

Roche has just published these fascinating facts about the enrichment of cereal grains—here gathered together in a popular edition for the first time.

Your personal copy is waiting—with our compliments. Send for it now. If you need more we'll be happy to fill your request for reasonable quantities.

The *principle* of enrichment is well-established. Many scientific studies have proved its value conclusively. Physicians, nutritionists, dietitians and governmental authorities whole-heartedly support enrichment.

The *practice* of enrichment is well-founded. 1956 marks the Fifteenth Anniversary of white flour and white bread enrichment in the United States.

Read for yourself the concise stories in this brochure *(see Table of Contents in panel above).* Here are histories that show how the many branches of a great industry modernized their foods along today's "good nutrition" lines. These "case histories" make inspiring reading. Included is the latest revised table of the famous Roche Review of Enrichment Requirements. We are proud to sponsor this publication.

ROCHE VITAMINS FOR ENRICHMENT

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The Road To Bad Sanitation Is Paved With COMPLACENCY

... And you may be on that road if you don't take full stock of your plant—to find out its true condition before a hard-boiled inspector finds it out for you

T. L. HUGÉ
American Sanitation Institute (Division of The Huge' Co., Inc.), St. Louis, Mo.

Pointed criticisms by the customers and blunt citations from the regulatory agencies can come very quickly when the food processor's sanitary performance falls down.

These troubles arise from the kind of plant conditions that result in actual contamination of food products. And so we find the unfortunate processors speedily putting through calls to the sanitation consultants, who can be of decided aid in pinning down the points.

Such revelations of bad plant conditions invariably seem to come as a complete surprise to plant management —something never anticipated. It's the old story: *"It just couldn't happen to us."*

▶ **Yet the bad conditions almost always can be traced back to management—in particular to complacency on the part of management.**

This *complacency* may be due to a lack of interest in modern, progressive sanitation. Or it may stem from a mistaken belief that the company's current sanitation program is truly effective.

In either case, management simply hasn't investigated the situation thoroughly.

Tracking Down the Causes

One of the most serious causes of this *complacency* is the false feeling, created in the food plant manager's mind, that his plant is sanitary. The erroneous belief may result from an inspection that is only perfunctory.

Later comes the true revelation, when a more thorough, competent inspection is made. And then management is embarrassed.

There have been cases where companies have received complimentary sanitation reports from their local or area inspectors—only to have them contradicted shortly thereafter by Federal Food & Drug inspections made with more care and disclosing insanitary conditions actionable for citation and, perhaps, prosecution.

If the initial investigations had revealed the actual insanitary conditions, the troubles undoubtedly would have been corrected immediately, thus avoiding the serious penalty resulting from the Federal inspection.

Thus, some inspections can be more harmful than helpful—when they fail to be exhaustive in their evaluations. For the sense of *complacency* they build up in management's mind results in a lowering of the sanitary level.

Can't Go by History

Management should know that it is always possible for a plant to be really insanitary despite a history of "passing" inspections. In short, management must be sure that the "passing-rate information" was derived from a really thorough sanitation check up.

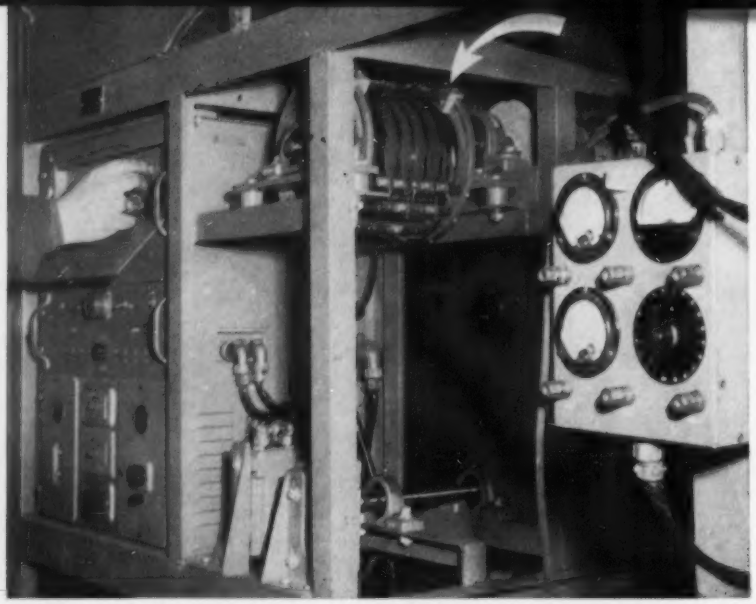
When a regulatory official looks over a plant, the manager should accompany him, thus determining the thoroughness of the inspection. And where the inspector does not make a detailed physical examination, the manager should realize that he is not getting a true sanitation picture, regardless of any seemingly favorable impression that may have been made.

We know of a number of cases where inspectors have failed to climb atop equipment, look under machinery, and disassemble units.

Another frequent cause for *complacency* is the tendency of some managements to place too much dependence upon a favorite system or type of sanitation. They may over-emphasize the use of a specific kind of pest control, or spraying technique, or fumigation, feeling sure that therein lies the answer. Granted, each of their choice methods may well rate as a valuable sanitation tool. But

(Turn to page 154)

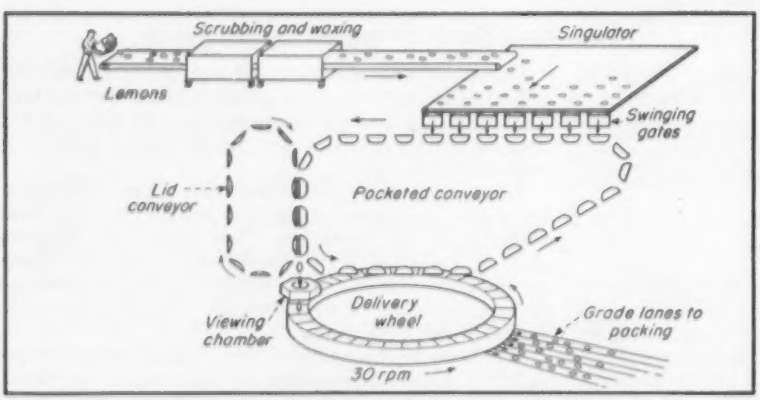
GRADUATED dials (adjusted by EMS Engineer Floyd Smith) permit changing width of color bands. Viewing chambers are seen (top).



MEMORY DRUM (arrow) has separate channel for each of the five color categories. When category is determined, by photoelectric tubes viewing each lemon, signal is recorded on proper channel, where it is retained until fruit is discharged from cup in delivery wheel.

Electronic Color Sorters Raise Both Speed and Accuracy

Further, manual labor is cut and uniformity of product is increased by new installation that automatically grades lemons in five color groups ranging from deep green to tree ripe. Use for apples and tomatoes seen



Lemons Traced From Box to Grade

Moving in on Singulator (top right), they are lined up seven abreast, then swinging gates open and allow fruit to drop into pockets of conveyor. As conveyor's direction changes from horizontal to vertical, it meets lid conveyor that closes pockets. Just above viewing chamber the two conveyors separate and lemon drops through aperture into pockets of delivery wheel. When above proper grade lane, trap door in pocket's bottom is sprung, fruit is released and conveyed to packing.

H. C. HOOD
Engineering Editor, McGraw-Hill Pacific Coast News Bureau, Los Angeles

A 6-machine installation now sorts lemons into 5 color groups at the striking rate of 1,128,000 per day in the Somis Lemon Assn. packing house, Oxnard, Calif.—and with much greater accuracy than was previously possible by hand sorting.

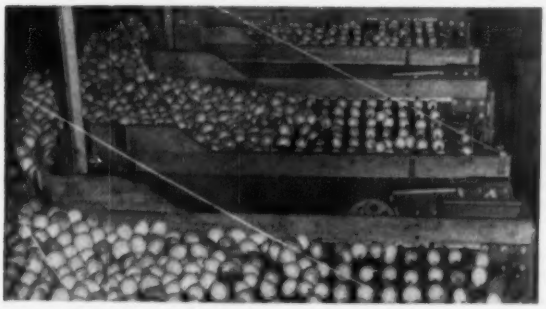
In addition, the machines have released 40 graders formerly engaged in the very trying manual task. These are now employed at other types of work.

The units were specifically designed and manufactured (by Electric Sorting Machine Co., Grand Rapids, Mich.) to color-sort lemons electronically, and this is hailed as the first major installation.

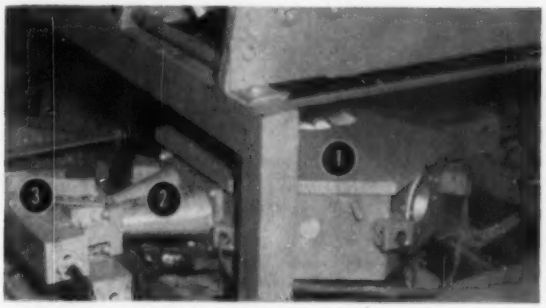
► **Notably, the equipment is seen equally applicable to other fruits and to vegetables within the size range of**

(*Turn to page 48*)

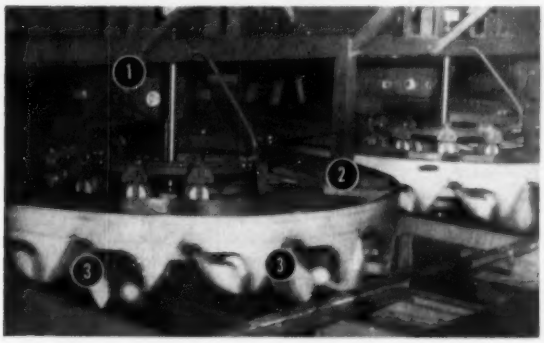
How New Sorters Accelerate Lemon Handling at Somis



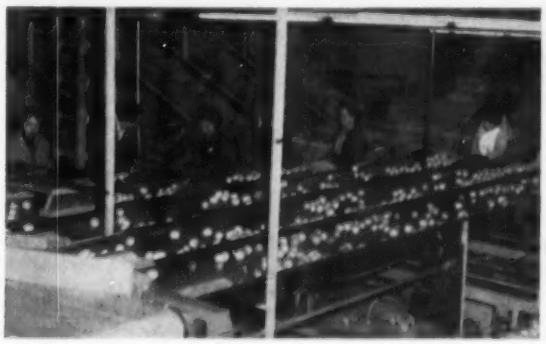
LEMONS enter feed table, where moving floor of notched boards forms them into ranks that drop out gate (right). They're then 'single-filed' to fall through . . .



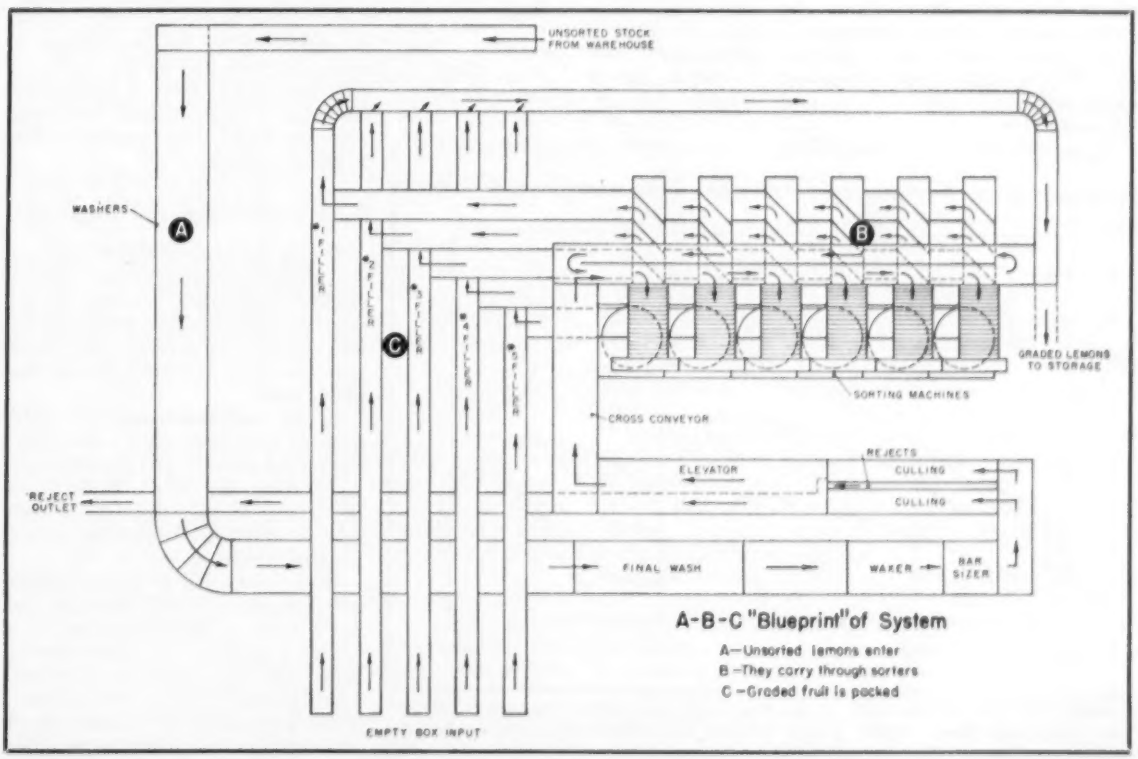
. . . **HEXAGONAL** viewing chamber (1), where light reflected from their skins is transmitted via 3-channel system (2) to photoelectric tube in housing (3).



FROM viewing chamber (1), lemons drop into rubber-lined pockets of delivery wheel (2), which rotates at 30 rpm. At signal from memory drum, trap doors (3) in pockets open, discharging fruit to specific trough below.



TROUGHS transfer lemons to belt conveyors that move them to the packing lines. Empty crates enter on inclines (background), are filled by women at ends of belts, then move under belts on roller conveyors (right).



A-B-C "Blueprint" of System

A—Unsorted lemons enter
B—They carry through sorters
C—Graded fruit is packed

1½-3 in., such as apples and tomatoes.

Problems faced in manufacturing the units proved to be considerably more involved than those encountered in producing machines for such products as beans, peas, seeds, coffee, and peanuts, which have been successfully color graded electronically.

Precision sorting of lemons requires careful discrimination among this fruit's five color groups—ripe yellow, silver lemon A, silver lemon B, light green, and dark green. For other products, divisions are limited to two or three categories.

Because of their susceptibility to bruising and other damage, lemons must be processed with greater care than most other products. Also, they are considerably larger than items previously color sorted electronically. And a large area of each must be scanned in order to arrive at an average color for individual fruit.

Incidentally, spotted fruit with distinct patches of dark green or bright yellow still present problems for electronic sorting machines.

Photoelectric Tubes Basic

Heart of ESM's machine is a pair of photoelectric tubes that receive light reflections from the lemons as they drop through a viewing chamber. Hexagonal in shape, this chamber is illuminated by six small bulbs mounted in the angles of the compartment. Shields in front of the bulbs reflect their light back against the white interior walls so that none is beamed directly on the falling lemons. The effect is similar to an integrating sphere such as is used with a spectrophotometer.

Light reflected from the falling lemon is gathered by a 3-channel optical system that enters the chamber at one side. Center channel is directed at front of lemon, and the others at mirrors mounted on back surfaces of chamber. The latter pick up light reflected from rear thirds of the fruit.

In effect, three "samplings" (120 deg. apart) are obtained. Each channel scans a 1-in.-dia. circle, thus three 1-in. vertical strips of the falling lemon are scanned.

Light transmitted through the channels converges on a striped mirror located at their junction. Of the total light, 50% passes through the mirror to one photo tube, and the other 50% is reflected to the second.

First tube is provided with a filter that permits only red light to reach the sensing element. The other has a filter allowing only green light to pass. The tubes emit a voltage signal proportional to the amount of filtered light they receive.

Colors Matched Electronically

Voltage outputs are fed through resistance elements, or filtering systems, and the red signal is electronically matched with the green one. A Thyratron (electronic power relay) fires when the electronic signal reaches the preset level, indicating a line of demarcation between two desired color categories. These lines may be adjusted by a graduated dial to widen or narrow the range of any of the five categories.

A Thyratron is provided for each two adjacent color categories. There is also a "memory" drum (with individual channels for each color group) synchronized with a delivery wheel located below the viewing chamber. When a Thyratron fires, a signal is recorded and retained on one of the channels of this drum.

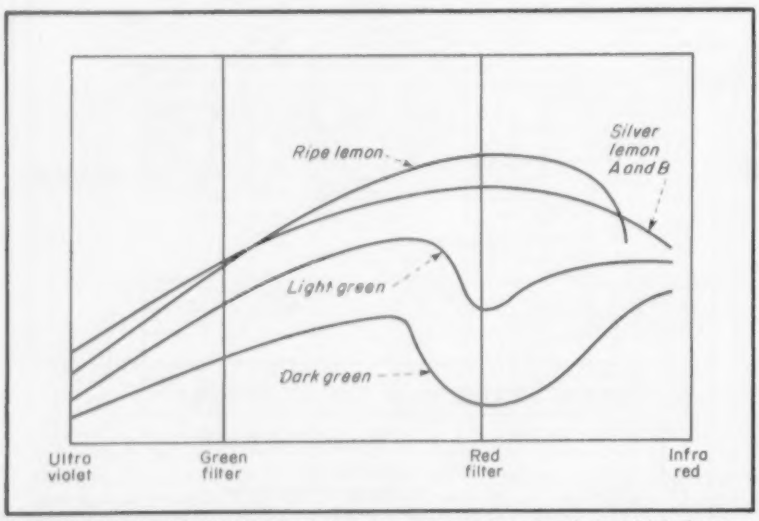
At maximum speed, eight lemons per second drop through the viewing chamber and into the delivery wheel's buckets, which are sponge-rubber-lined to cushion their fall. The wheel, which turns continuously at approximately 30 rpm., is mounted above five conveyor belt paths.

Each bucket is equipped with a trap door actuated by a solenoid that receives a signal from the memory drum. The intelligence recorded on the drum follows each bucket (and lemon) as it travels to the delivery station.

At precisely the right moment, the trap door is sprung over the proper path, and the lemon drops to the specific conveyor that delivers it to packing crates with other fruit of the same color category.

As an example: If the lemon is dark green in color, the Thyratron corresponding to the line of demarcation between light and dark green will be fired by electronic intelligence initiated by the photo tubes. This will record a signal on the dark green lane of the memory drum, and this signal will be retained until the bucket, in which the particular lemon is traveling, is directly over the proper delivery lane. Next, another signal is transmitted to the solenoid, which then opens the trap door and allows the lemon to drop into the lane.

Trap door is automatically closed, and signal on memory drum is erased in preparation for the next lemon. A condenser, mounted on the inside of each lane of the drum, is charged by the firing Thyratron, and discharges when the signal is transmitted to the trap-door solenoid.



CHARACTERISTIC CURVES of the five color categories into which lemons are separated. Silver lemon A and B were superimposed to represent predominant color for a particular batch of lemons.

Color Compensator and Regulator

During the instants that lemons are not dropping through the viewing chamber, the optical channels are focused on reference spots located on its inside walls. Of a fixed color, these spots produce a 128v. output from the photo tubes.

If, for any reason, output signal reflected from these spots is not 128v, the proper correction is automatically made within the circuit. Eight times per second, output signal from each tube is automatically checked against the basic reference level.

In the operation at Somis, lemons are scrubbed and waxed, then elevated (by a series of belt conveyors) to a common conveyor (see accompanying A-B-C drawing). From here they roll into separate feed trays (Singulators). There are six of these, one above each

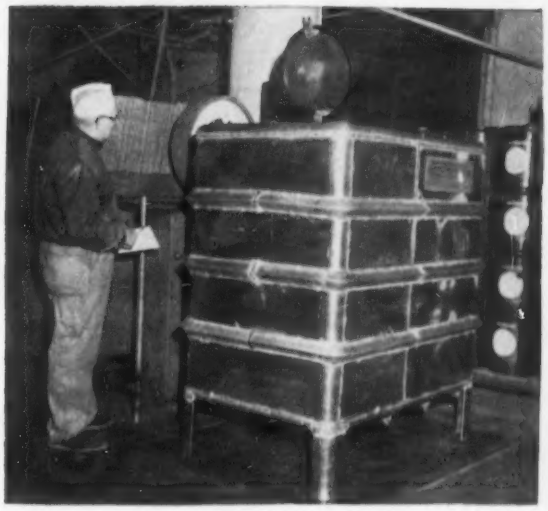
(Turn to page 99)

By Bulk-Shipping Liquids

Bins Win Again

Milwaukee chocolate refiner gains new flexibility and cost benefits with special bin units for transporting bulk liquid-chocolate products to candy and biscuit manufacturers

L. RUSSELL COOK and CHESTER KWIECINSKI
Respectively, President and Production Manager, Ambrosia Chocolate Co., Milwaukee



IT'S AS SIMPLE AS THIS: Liquid chocolate is gravity-filled into this special bulk-handling bin. Then, after scaling (above), it's loaded by fork-lift truck into heated trailer for 3-4 hr. run from Milwaukee to user's plant in the Chicago area.

Bulk delivering of raw materials going into the manufacture of foods is *really* catching on these days.

There are some excellent reasons for this—as we at Ambrosia Chocolate Co. noted. And so these cost-cutting bulk-handling changes haven't caught us asleep at the switch.

A prime example is the shipment of chocolate to candy and biscuit makers.

Conventional practice has been to send the chocolate coating in the form of 10-lb. molded slabs, packed five to a container. But only a few years ago a significant change took place in the shipment of these coatings—that is, transporting of liquid chocolate in bulk in insulated or hot water-jacketed stainless steel trucks.

In any event, our company lost no time in adopting this method for making shipments to those of our customers who were suitably set up to receive bulk liquid chocolate.

In our plant, liquid chocolate is gravity-fed from water-jacketed, agitator-type, thermostatically-controlled storage tanks (45,000-lb. capacity) into insulated or jacketed tank trucks.

Holding about 30,000 lb. of liquid chocolate (at 130-140 deg. F.), these trucks are filled in about 30 min. Their shipment to the Chicago area takes 3-4 hr., with 5-10 deg. temperature loss for insulated trucks (depending upon weather conditions), and no temperature loss for the jacketed trucks.

Now—A New Technique

Then we adopted still another form of shipping liquid chocolate in bulk form. It involves using specially designed aluminum bulk-handling bins, made for us by the Cream City Boiler Co. of Milwaukee. These are shipped within a 100-mile radius of Milwaukee in trailers with built-in blower-type heaters.

The bins measure 34½x53x54 in., and each holds 4,000 lb. of liquid chocolate. Inlet port is of 17-in. dia., and its Neoprene-gasketed cover is easily and quickly secured with a pair of wing nuts. The outlet pipe is reduced from 5 in. to connect to a 2-in. pipe or hose.

Bins are constructed of ⅛-in.-thick panels, supported horizontally with three reinforcing bands. And they are mounted on ¼-in.-thick legs giving elevation for fork-lift truck handling.

These bins are also gravity-filled from liquid chocolate-storage tanks, transferred by fork-lift truck to a floor-level scale (see photo), and then loaded five to a thermostatically heated trailer.

The door-to-door Chicago deliveries take up to 4 hr. Receiving companies unload bins with fork-lift trucks and either pump or gravity-feed liquid chocolate into their own jacketed storage tanks.

Factors Weighed

Now to a check of advantages and factors of the tank truck and bin bulk-handling methods at our plant.

Eliminated, of course, are the costly in-process and handling chores. We no longer need to deposit the chocolate into 10-lb. slabs, then cool and pack them into 50-lb. cases that must then be handled in and out of storage for final shipment.

And abolished in the user's plant is the in-and-out storage handlings, also the old practices of running the slabs through chocolate breakers and then melters.

Savings attained in our refiner's plant are passed on to the user in the form of lower FOB-factory prices. Further, freight costs may be to the advantage of the user, depending upon rates between shipping and receiving points.

Better sanitation is another significant benefit, since bulk handling of the liquid chocolate is in a completely enclosed system.

Finally, considerable floor space is saved, both in our plant and in users' plants, especially with the employment of floor-to-ceiling storage tanks.

The bins provide an additional advantage over tank trucks: Users can receive as many as five different types of liquid chocolate in a shipment.

But, of course, there are also special factors to be considered with both bulk methods of shipment. With the tank-truck system, the user requires holding tanks large enough to receive a tank-truck load, plus reserve capacity as insurance against production down-time.

Furthermore, deliveries must be carefully scheduled to avoid production delays.

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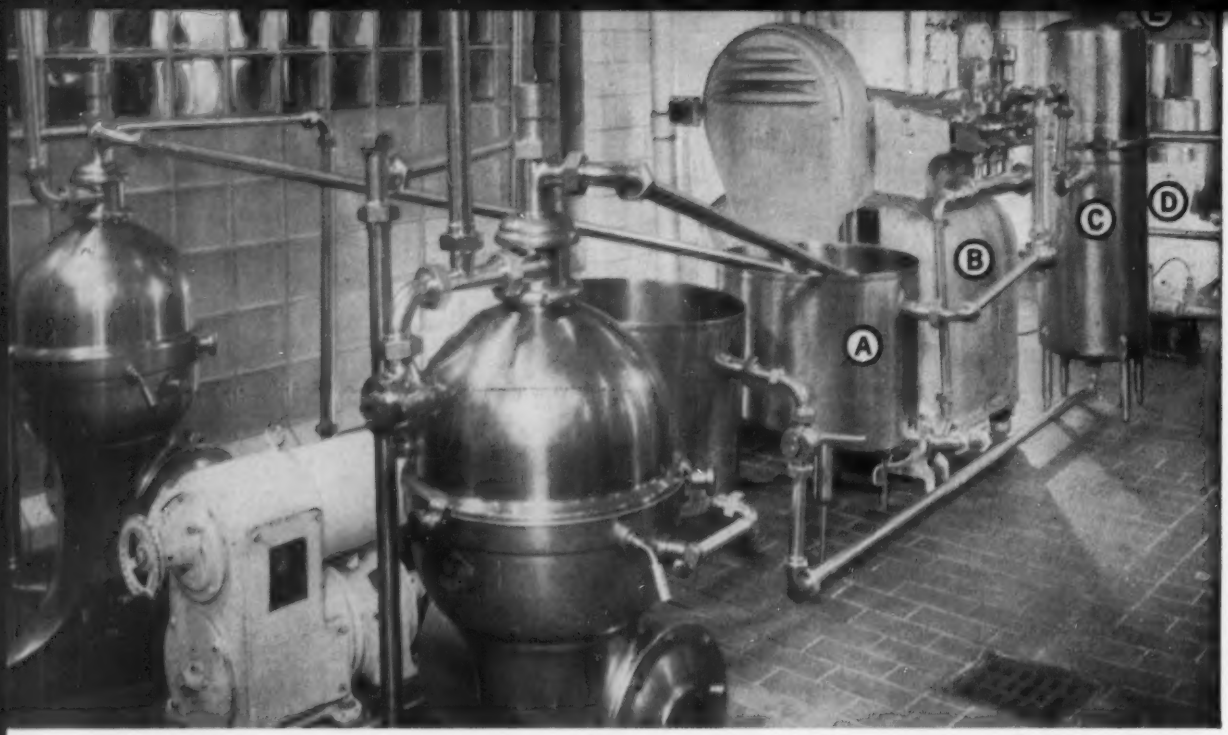


SPACE-SAVING and sanitary features of continuous buttermaking are strikingly exemplified in Rice Lake Creamery setup. Concentrated from 40 to 80% fat in two separators (foreground), cream discharges to tank (A) that supplies phase reverser (B). Butter-fat-serum mixture then goes to tank (C), where fat rises and serum settles. For anhydrous fat, former flows to centrifugal polisher (D), then to vacuum pan (E).

Milk to Butter or Fat —In *Uninterrupted* Flow

Flexible, continuous line at Wisconsin plant makes uniform quality butter or long-keeping anhydrous fat directly from fresh whole milk. Carefully engineered system minimizes labor, makes sanitizing easy

HOWARD DAVIS and D. C. ROAHEN

Research Engineers, The Creamery Package Mfg. Co., Fort Atkinson, Wis.

Striking flexibility and straight-through flow of products mark the streamlined operations at Rice Lake Creamery Co., Rice Lake, Wis.

Especially novel is the continuous making of butter and/or producing of anhydrous milk fat on the combination line (installed by our Creamery Package Mfg. Co.).

Facilities have also been set up for drying skim milk at a low-temperature to produce high quality non-fat dried milk solids. This provides flexible and efficient production facilities heretofore never available in a butter and powder plant.

For instance, in a continuous operation, raw milk is processed into ¼-lb. butter prints (cartoned and boxed) or into standard 60-lb. cubes at the rate of 2,000 lb. per hr. Operations can also be readily switched for non-stop production, at the same rate of anhydrous milk fat (99.8% butterfat).

Notable Benefits Achieved

Compared with the conventional, batch-type churn method, this continuous buttermaking wins 10 advantages—

1. It substantially reduces and better utilizes labor. Workers' tasks are also easier.

2. There is continuous flow, from receiving room entrance, of milk to finished butter in ¼-lb. prints or 60-lb. boxes.

3. The system meets rigid sanitary specifications. Equipment, of stainless steel, complies with general design requirements of the 3-A Sanitary Standards.

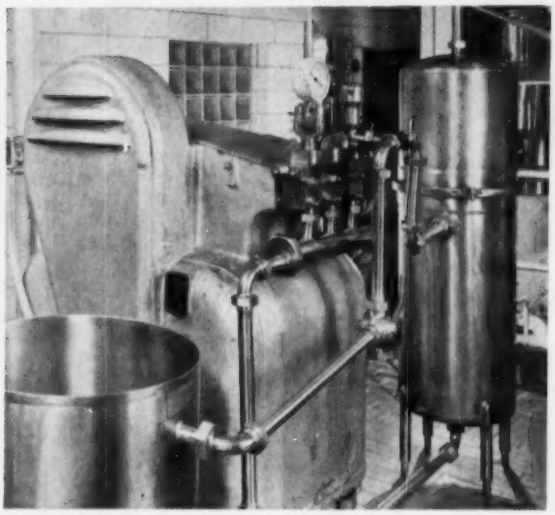
The entire setup is completely enclosed, and it can be cleaned by latest in-place circulation techniques.

4. Takes less floor space.

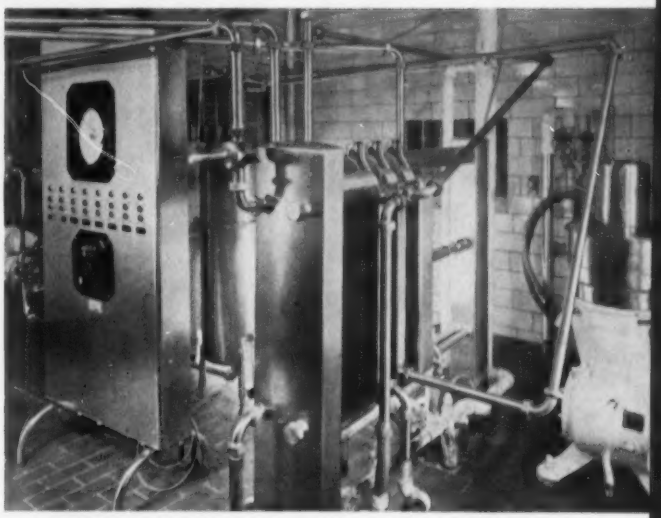
5. Minimizes need for previous experience of workers.

6. Operates with minimum of maintenance and replacement expense.

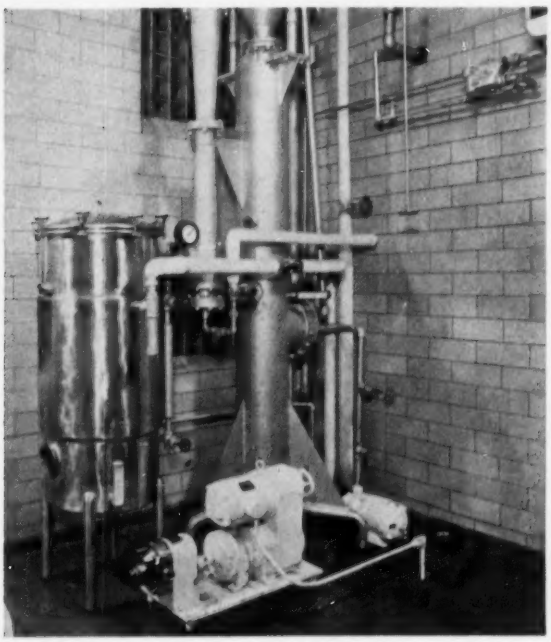
Specialized Units Make Process Tick



1 **HEART** of system is homogenizer-like unit that breaks serum film surrounding individual fat globules, enabling them to rise and separate in tank (right).



2 **PLATE** heat exchanger (foreground) insures optimum temperature at each processing step. Oil purifier (right) removes last trace of serum from fat.



3 **SMALL** vacuum pan draws off last trace of moisture, discharges anhydrous product containing 99.8% of butterfat, that has long shelf life.

4 **BUTTER** from crystallizer (right) is filled in parchment-lined containers and check-weighed (left). It may go directly to ¼-lb printer.

7. Assures easy control over losses of fat.

8. Permits processing of all skim milk into top-quality, low-heat milk powder at substantially greater return.

9. Provides pin-point composition control in standardizing butter to the 80%-fat limit, with corresponding savings in butterfat.

10. Controls seeding of butter crystals and finely dispersed moisture to produce a smooth, waxy, close-grain texture, as well as uniform distribution of salt and moisture.

The process also assures precise temperature and ingredient control. Flavor is varied to meet different market demands. Composition, flavor, and body are more accurately maintained to smaller tolerances than in the churn method, despite seasonal changes in butterfat.

Start of Butter Process

Now for the 'specifics' on Rice Lake's operation:

In conventional manner, raw milk is received from farms in 10-gal. cans and dumped in a weigh tank. From

here it is pumped through heater section of a plate-type unit, where its temperature is raised to approximately 90 deg. F.

Milk is then pumped through four De Laval separators at a rate of 11,000 lb. per hr. per unit. Skim milk is collected for drying, and the 40% butterfat cream is heated to 195 F. in another section of the plate unit. For buttermaking, latter is cooled to 165 F. and pumped to the heavy cream separators. Otherwise, the cream is further cooled to 40 F. and held in storage tanks.

Actual buttermaking starts with concentrating of cream from 40 to 80% butterfat. Former is heated to 155-165 F. and collected in a 30-gal. balance tank. From here it is metered by a positive pump to the heavy cream separators. Cream (80% fat) is discharged into a 50-gal. double-compartment tank. Skim milk is cooled, dried, and used to make such products as non-fat dry milk solids.

Phase Reversal Is Key Step

From the double-compartment tank, the 80% cream (161-162 F.) is moved by centrifugal pump to the phase reverser—a unit similar to a homogenizer. Here, through accurate pressure control, the protein-phospholipid complex surrounding the fat globules is broken. In this way, the fat is freed of non-fat particles that formerly held it in suspension.

This butterfat-serum mixture proceeds directly to the serum separator. It enters this gravity-type unit just below the center, with the fat floating upward and the serum settling downward. Serum is returned to the 40% cream balance tank, which supplies the heavy cream separators, thus preventing fat loss in this step.

Then major portion of the serum is removed from the fat, which emerges at a concentration of 98.5-99%. It is next heated to 190 F. and immediately cooled to 110-120 F. in a cooler section of the plate heat-exchanger.

Standardizing the Product

The high-fat product flows to a battery of insulated, jacketed composition-control vats (300 gal), equipped with vertical type agitators. Here it is laboratory-standardized for butterfat, moisture, salt, and curd content. The standardized butter mix is then thoroughly agitated to insure complete uniformity.

Cooling and crystallization are the final steps. A homogenizer fed by a centrifugal booster pump forces the butter mix, at a 2,000-lb./hr. rate, through a horizontal, double-cylinder ammonia-cooled chiller that cools it to 40 F.

The mix then goes to the crystallizer, where controlled fat-crystal growth takes place through the action of a hydraulically operated dasher.

As it emerges, the butter can be handled either by a printer or a box filler. Former forms two 4-oz. prints at a time. These are parchment-paper wrapped, then packed four to a carton.

The pneumatically operated box filler bulk-packs 60-lb. cubes in parchment-lined fiberboard cartons. These are moved over a roller conveyor to the check scale.

Anhydrous or Dry Fat

In view of the current highly competitive conditions, today's creamery cannot limit itself to production of butter alone. It must be able to process raw milk into products that can be used in other markets and that can be easily transported and stored without loss of quality even with delayed use.

According to the U. S. Quartermaster Corps, anhydrous milk fat or dry fat must test not less than 99.8% butterfat and must not have more than 0.1% of moisture or curd.

Dry fat must not be confused with butter oil, which does not meet these rigid specifications, and which can be made from butter or other fat sources. Dry fat is made only from high quality fresh milk and its resulting sweet cream.

Our manufacturing company developed a continuous process for making anhydrous milk fat with 99.95%, or higher, fat without flavor loss. It is notable that very large quantities of recombined milk and ice cream mix are made each day in foreign countries using this fat.

In the manufacture of this fat, the same apparatus is used as in continuous buttermaking, together with a few

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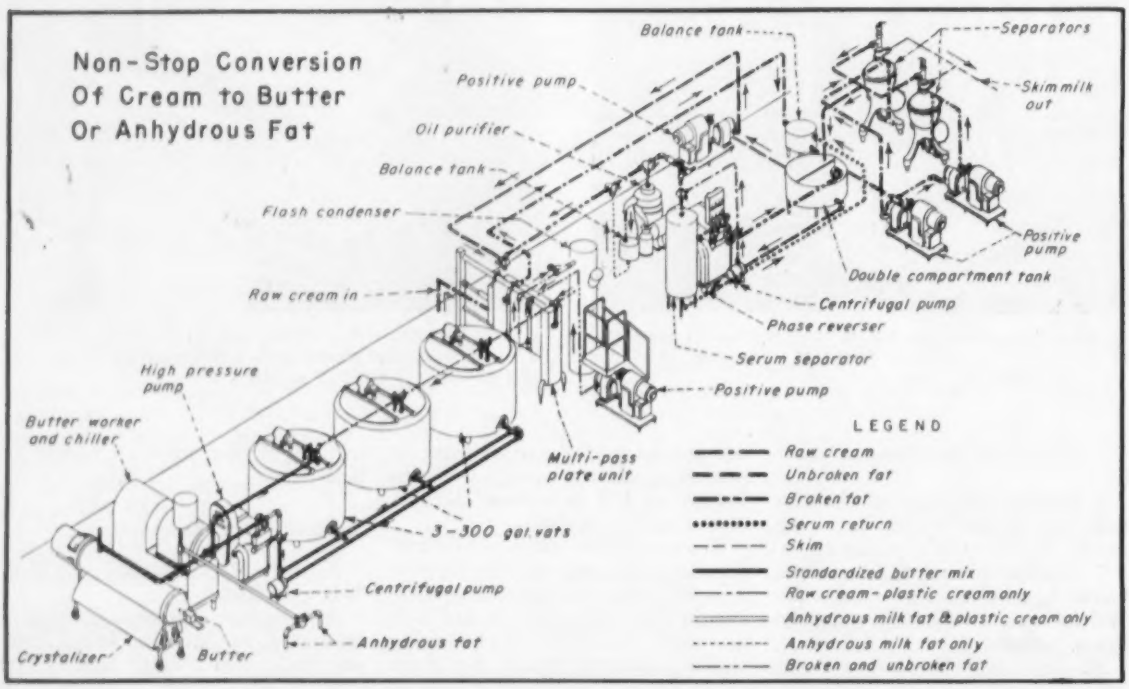
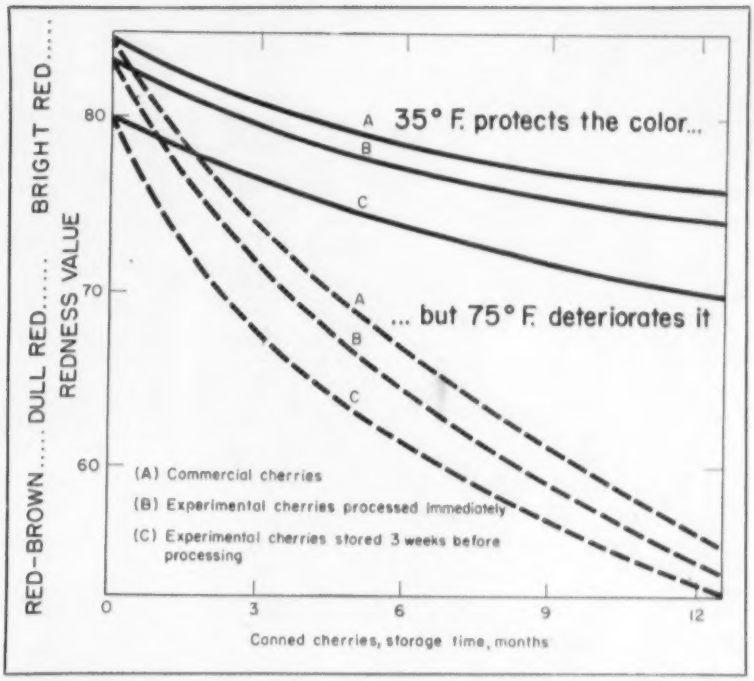




Way to maintain fruit's attractive hue indicated as special USDA tests "spell out" bad effect of higher warehousing temperatures

How to Safeguard the Redness Of Stored Canned Cherries

R. T. WHITTENBERGER and C. H. HILLS

Eastern Utilization Research Branch, Agricultural Research Service, USDA, Philadelphia

The bright red color of freshly canned cherries is a prime sales booster. Accordingly, both grower and processor take pains to guard that hue.

But this is wasted effort if the color is then permitted to deteriorate in storage. Here, low warehousing temperature can be credited with making the difference between a superior pack and one with washed-out shades of maroon.

To evaluate this effect on a quantitative basis, we studied the influence of storage temperature on the color retention of variously processed fruit. This showed:

- Some loss of red pigment after 2 months at 75F., serious loss after 6 months.
- But at 35F., loss of pigment is negligible after 6 months, and cherries are still attractive after 1 year of storage at this temperature.
- Furthermore, storage of fresh, unbruised fruit in air before processing causes insignificant color loss compared with that occurring during subsequent storage of the canned product.

In our experimental procedure at Eastern Regional Research Laboratory, we heat-processed three lots of cherries in cherry-enamel tins, measured their color, and stored them.

The first lot—(A) on graph—consisted of commercially handled fruit from a processing plant. Second and third lots—(B) and (C), respectively—were experimental fruit picked and handled with a minimum of bruising.

The second lot was processed immediately, and the third was stored in air at 35F. for 3 weeks before processing. Half the tins from each lot were stored at 35F., the others at 75F. Color observations were made during storage.

Redness was gaged by comparing fruit color with colors on Munsell charts. Juice color was indicated by percent absorption at 520 mμ of a filtered, diluted (1 + 3) aliquot in a 1-cm. cell.

Spectrophotometric juice measurements are shown on the graph, along with word descriptions of cherry color based on the Munsell study.

Test Results

Each lot of cherries differed in initial redness, the reddest being those from the processing plant. All lots, however, were similarly affected by storage in that their redness decreased. Color losses were especially rapid in samples stored at 75F.

It may be noted, in passing, that warehouse temperatures in the 90's are not uncommon.

After only 2 months at 75F. some loss of red pigment could be detected. But the loss had reached serious proportions at the end of 6 months.

In consumers' terms, the graph shows that these cherries retained their "extra good look" for 2 to 3 months when stored at 75F. But after about 6 months, they had lost much of their color appeal.

Storage at 35F., however, presented an entirely different picture. These cherries retained their bright appear-

(Turn to page 143)

BEER FLOWS continuously, via plastic hose (top), to sampling cells of photometer. Here, a direct reading is taken of filter's performance in polishing brew. Cycle may also be ink-recorded on tape.

ROBOTIZED FILTER

Boosts Quality Control

DR. MAX ZIMMERMANN
Master Brewer, Blitz-Weinhard Co., Portland, Ore.

Final beer filtration, that critical point in the process where the brew is polished to give it clarity and brilliance, may soon become a completely automated operation.

The latest advance—transition from pulp filters to properly designed powder filters—represents a milestone in the evolution of this filtration.

► Under near-automated control, the new system produces brilliantly polished beer having a shelf-life at least equal, and probably superior to, that of beer produced with pulp filtration. It saves 66% of labor when compared to pulp filter operations and, also, shows savings in materials. The cost of pads and filter powder is 0.6-0.7c. per barrel of beer. Life of the pad is 50,000 bbl. minimum.

Combined here are a filter (Filtrodur) and photometer (Filtrox), with the resulting system bearing the name of the maker, Filtrox Mfg. Co., of St. Gall, Switzerland.

Our filter, here at Blitz-Weinhard Co., Portland, Ore., is a plate-and-frame unit employing 31½-in.-square filter pads. It has 30 frames. And 20 more frames may be added if needed. Pads are of a composition (fiber) and thickness (⅛ in.) to insure against possible break-through. Their sole purpose is to accumulate the diatomaceous earth, rather than to filter.

Connected to the filter by a pipe system is the slurry feeder. Both unfiltered beer and water lines serve this unit. Filter slurry is pre-mixed in another tank and may be pumped to the feeder without interrupting filtration.

The photometer is a direct-indicat-

ing, high-capacity apparatus for objectively measuring absorption and turbidity according to the null method. While it may be read directly, it is a recording instrument, providing a filtration record for each cycle.

It requires little manual attention. Except for inserting the sample cells and occasionally setting the 100% equalizing screw, no other adjustments are needed.

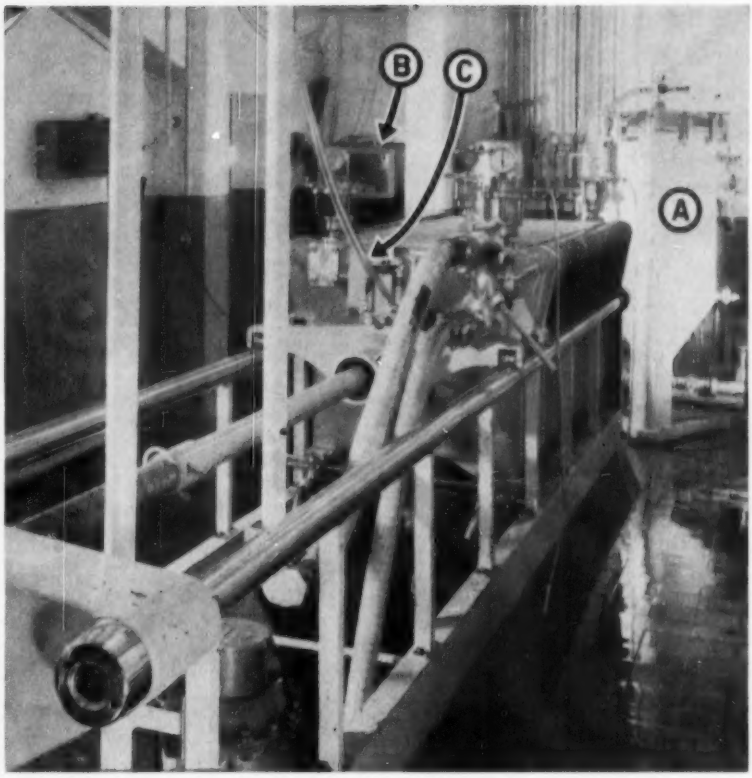
A plastic-hose by-pass system circulates the beer sample from filter to photometer. To maintain pre-set clarity, the instrument actuates an automatic valve at the venturi on the slurry feeder, opening it wider when the clarity (9-11 photometer reading) of beer drops below set standards. Another venturi at the connection to the discharge side of the filter produces a pressure differential which serves to recirculate filtered beer through the by-pass.

Operating Details

The filter is fed with water and unfiltered beer by a centrifugal, 60-psi. pump. To begin a cycle, a precoat consisting of 20-lb. each of Hy-Flo and No. 505 (Johns-Manville) and 1-lb. asbestos powder is mixed with water in the mixing tank. This is then pumped to the slurry tank.

Water from the circulating tank (about 10 bbl.) is first circulated slowly through slurry tank and filter for about 10 min. to gradually build up the precoat. Then it is circulated for about 20 min. at the regular rate used for filtration.

Then the water is cut off. And after the water has been expelled, unfiltered beer from selected tanks is blended, then fed to the system. This is recirculated for about 5-10 min. until it attains the clarity indicated by the photometer setting. Thereafter, the filter is operated under control of this automatic instrument (until it is opened for washing).



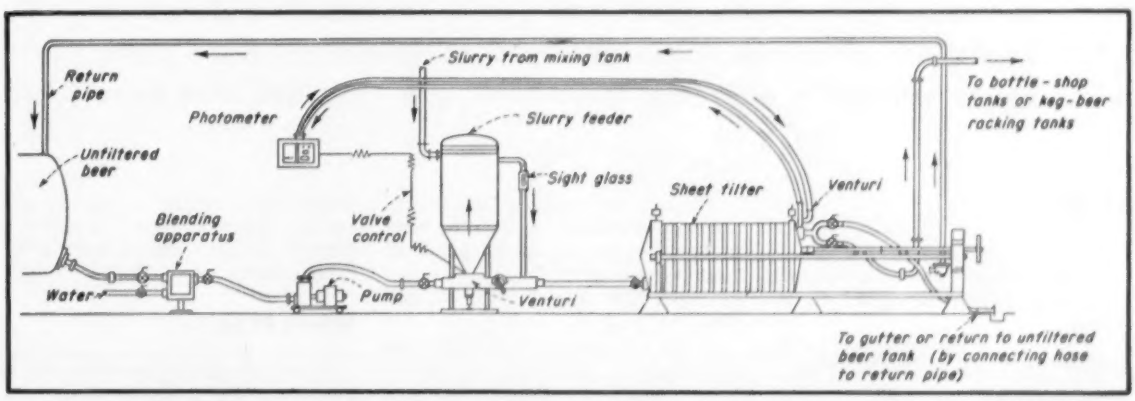
CLOSEUP of Blitz-Weinhard installation. Slurry feeder is seen (A), photometer (B), and plastic by-pass hose (C). From discharge end of filter (foreground), polished beer is piped to either bottle shop or racking tanks.

The pressure drop over the filter, at the beginning of a cycle, is about 2 lb. (40 psi. at inlet, 38 psi. at discharge). After filtering 2,000-3,000 bbl., pressure drop reaches 40 psi. (from 60 to 20), and the filter must be opened to wash accumulated materials from the pads and apply a new precoat.

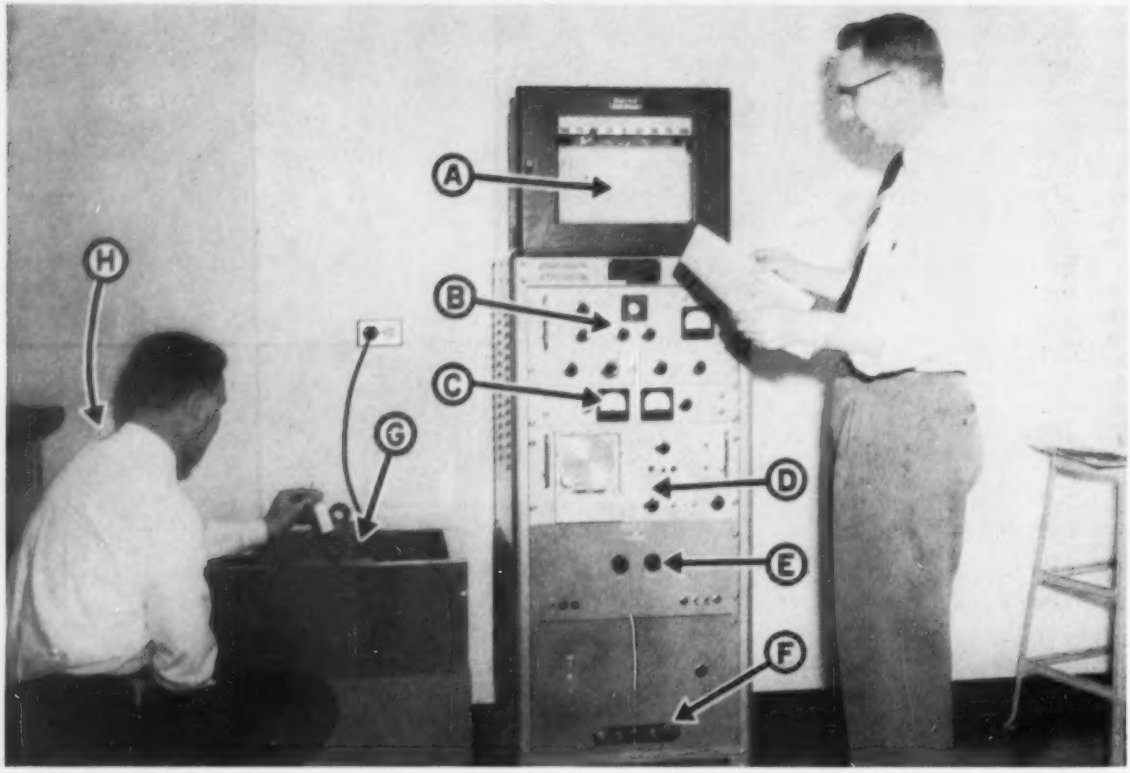
After washing, the filter is closed and flushed with water. At the start of the following cycle it is backwashed at one-half the filtering rate (60 bbl./hr.). When the discharge water is clear, new precoat is added to filter.

Between shifts, when the filter is not in operation, the precoat is retained intact by maintaining a slow flow of water through the filter, at 20 psi. at the inlet and slightly less at the discharge.

At the week-end, a 1% Diversol solution is circulated through the unit for 15 min. It remains in the filter system until Monday morning, when the filter is drained and flushed with water by backwashing prior to applying the first precoat.



WHEN ON-STREAM, as depicted here by arrows, filter system is automatically controlled during entire cycle.



N-M-R MOISTURE METER makes check in less than 30 sec. Here, in Corn Products Refining Co.'s research department, T. F. Conway (left) gets ready to run a test by putting the sample between pole faces of a magnet, while R. J. Smith (right) has stripped chart from recorder prior to measuring signal amplitude due to moisture. This Corn Industries Research Foundation unit comprises (A) recorder, (B) narrow band-pass amplifier and phase detector, (C) metering panel, (D) sweep and modulation generator, (E) high power supply, (F) low power supply, (G) permanent magnet, and (H) rf oscillator and detector (hidden behind operator).

New Quality-Control Tool

Nuclear Magnetic Resonance

It promises quick, continuous instrument checks and regulation of products in process . . . Meanwhile, it unsnarls tough food-research problems—gaging starch moisture in mere seconds where vac-oven technique takes hours

FE STAFF

Now being heralded as "just ahead" is a new and very promising advance in the quantitative analysis of food elements.

In fact, the present planning points toward application of this latest measuring technique in process control, as well as for basic research studies.

The new tool—called n-m-r (nuclear magnetic resonance)—is a special spectroscopy device put in the hands of food technologists by the nuclear physicists (FE Aug. '55, p. 80, and Mar. '56, p. 194).

Briefly, the technique depends upon the magnetic properties of nuclei. Under controlled conditions, they pick up radio-frequency energy. And the energy absorbed is a gage of the amount of material—say, the moisture content in the case of water's hydrogen nuclei.

What It Is

Specifically and technically, this is the basis of the method:

Many nuclei act like tiny magnets.

That is, they have unique, well-defined magnetic properties, just as they have a certain mass and electric charge. Measured, here, are extremely weak nuclear magnetic effects. Physicists call them the spin (angular momentum) and the magnetic moment.

Separation and identification (even quantitatively) is possible, because each nucleus has a different gyro-magnetic ratio. To the physicists, it means the ratio of spin to magnetic moment values.

What It Can Do

Now about what n-m-r offers:

As an analytical tool it is rapid—requires less than 30 sec. to obtain a moisture signal, whereas conventional moisture methods require from 1 to 5 hr.

Further, sample preparation is minimized. And one sample can be used repeatedly without being destroyed.

In addition, there is now ample evidence that this new technique will, in special cases, play important roles in routine moisture analysis of food ingredients and products.

Equally promising, though yet speculative, is the application of n-m-r for basic researches involved with: (1) Food-ingredient blending, such as the interaction of liquids and solids during cooking, mixing, cooling, and holding; (2) mixing of bread doughs, cake batters, sausage emulsions, etc.; (3) fermentation of doughs, beers, wines, etc.; and (4) changes in foods during freezing, dehydration, and storing.

As pointed out, n-m-r is seen applicable in food process control. No reason why it can't provide rapid moisture indication—by passing material in process through a probe attached to a detecting system.

More than that, work at Southwest Research Institute points to instrument-use of this technique in the corn wet-milling field for continuously measuring moisture content of starch products, and then automatically controlling such units as dryers and blenders.

Similar applications are foreseeable in other branches of the food industry.

Most important in the industry-wide aspect is the possible n-m-r instrumentation in respect to moisture checkups.

Incoming raw materials might, for example, be moisture-analyzed for cost-saving purchases and production economies. Materials would be reliably in-plant-checked through indication of an electrical signal that will control processing equipment.

And, there would be cost and quality benefits for processors and consumers, since water-containing finished products would be continuously and automatically re-checked.

About 5 yrs. ago, scientists at USDA's Western Regional Research Laboratory looked into the n-m-r method. They found that wheat starch produced a narrow signal on a chart recorder that was superimposed upon a wide, weak one of about 9 gauss.

Clue here was that amplitude of the narrow signal changed (almost linearly) with moisture content, while the broad one was traced to hydrogen in solid carbohydrates.

Southwest Research Institute then checked into n-m-r's potentials as a swift and non-destructive instrument method for continuously determining moisture.

Today, two companies in the wet-milling field—Clinton Foods, Inc., and Corn Products Refining Co.—are experimenting with the technique in their research and control laboratories.

Already, interesting results have cropped up at Corn Products research laboratories, where an n-m-r unit* has been employed for a little over a year.

It is particularly significant that moisture results by n-m-r closely correlate with those obtained by the conventional vacuum over-drying technique. This is relative to a wide variety of native and derivatized corn starches, dextrines, sugars, and syrups.

So next to be looked into is development of a simplified version of the present instrument or an in-process analyzer.

What Researchers Did

The CP researchers first prepared dry and wet starches in the 6 to 15% moisture range by laboratory techniques, and then they made single-sample checks with the new and conventional methods. Later, they random-checked samples of products in various stages of processing.

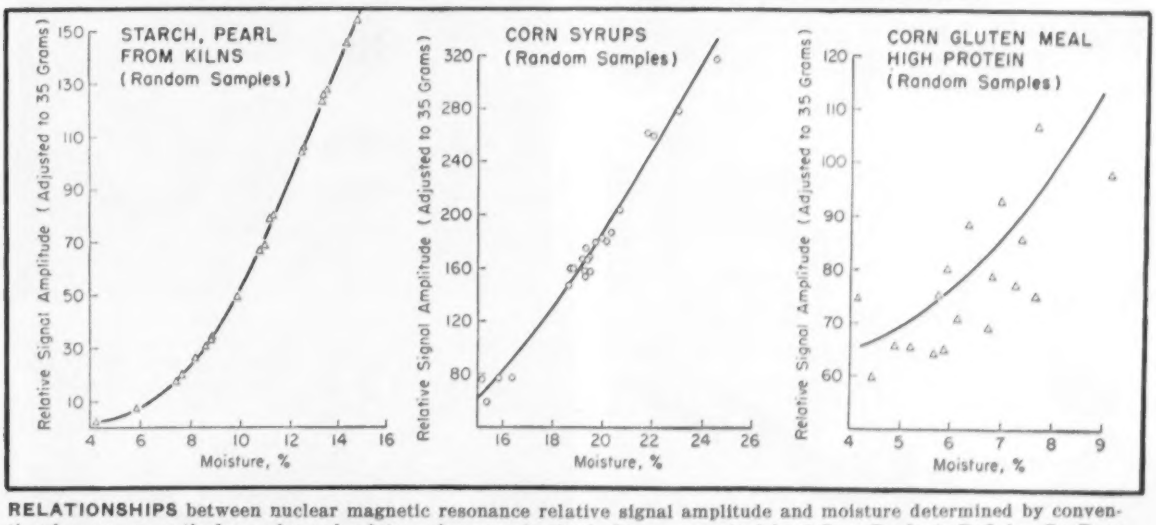
Here, briefly, is how the moisture testing was carried out by the n-m-r method:

Glass-sealed samples were weighed and put in a cell surrounded by a radio frequency coil located between poles of a magnet producing a constant,

(*Turn to page 208*)

* Constructed by Southwest Research Institute, using fellowship funds supplied by Corn Industries Research Foundation.

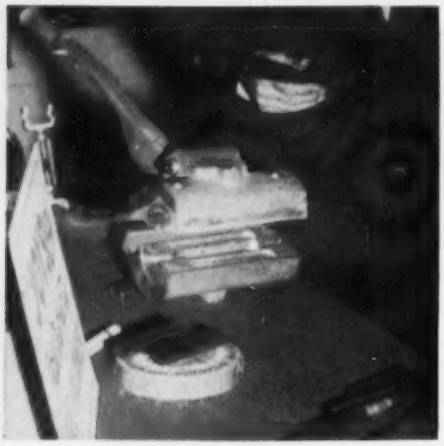
N-M-R SIGNAL AMPLITUDE VS. MOISTURE CONTENT
In Checks of Pearl Starch, Corn Syrups, and Corn Gluten Meal



RELATIONSHIPS between nuclear magnetic resonance relative signal amplitude and moisture determined by conventional vac-oven method are shown by data and curves for typical process materials at Corn Products Refining Co. Poor correlation in chart for meal samples (right) is explained by fat interference.

4 Power Tools and a Construction Kit

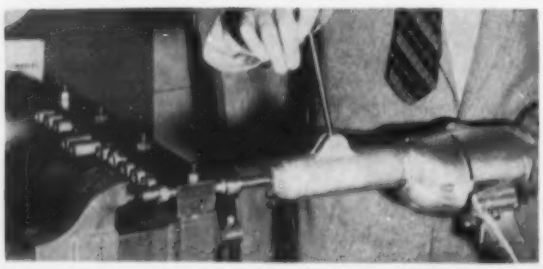
VARIABLE FILTER—used with a previously-developed vibration analyzer—spots noise, vibration, and mechanical difficulties stemming from unbalanced rotary machine parts.—International Research & Development Corp., Columbus, Ohio. (58A)



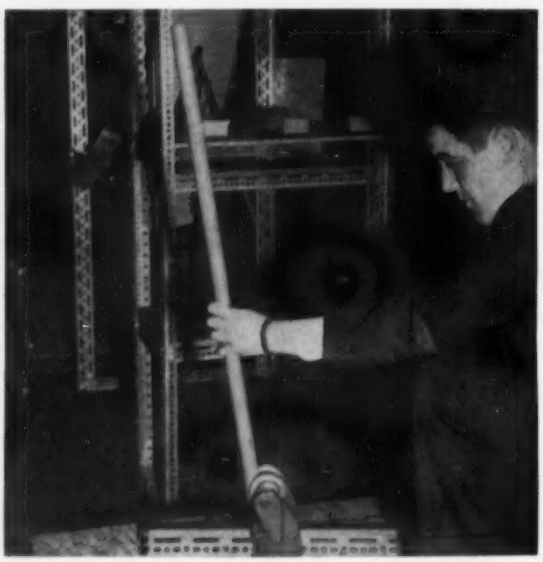
PORTABLE VULCANIZER enables on-the-spot repairs of electric cable and air hose. Available with various molds.—Joy Mfg. Co., Pittsburgh. (58B)

19 New Maintenance Aids . . .

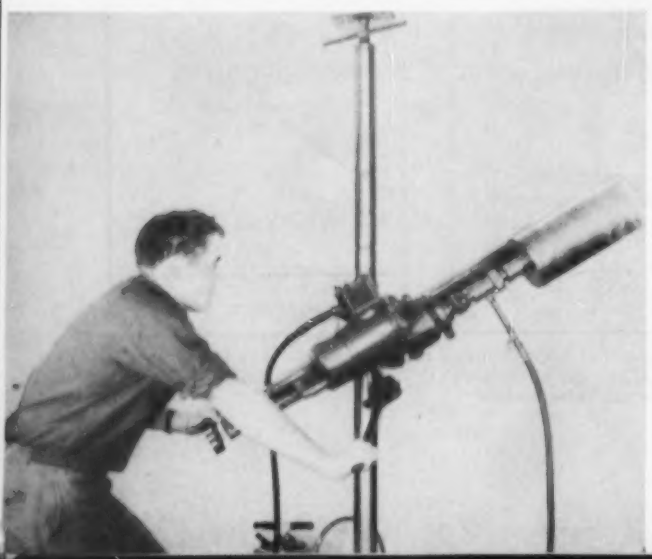
. . . Seen at Plant Engineering & Maintenance Show, Philadelphia



SPEEDY CUTTER severs ⅝-to-1-in. tubes inside heat-transfer equipment. Electric- or air-powered units are available with or without oil-feed attachment.—Airetool Mfg. Co., Springfield, Ohio. (58C)



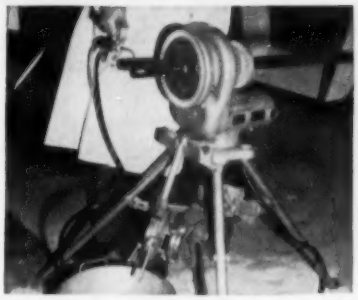
SUPER "ERECTOR" SET is latest aid for plant construction. Slots in steel angle are on 3-in. centers. Unit package contains 10 pieces, in 10- or 12-ft. lengths, and 75 nuts and bolts. Special cutter prevents burrs.—Acme Steel Co., Chicago. (58D)



FOR DRILLING HOLES up to 6¼-in. dia., this portable, 110 v. machine fills the bill. Telescoping mast anchors unit between floor and ceiling or opposite walls. Head swings through 360 deg.—Wheel Trueing Tool Co., Detroit. (58E)

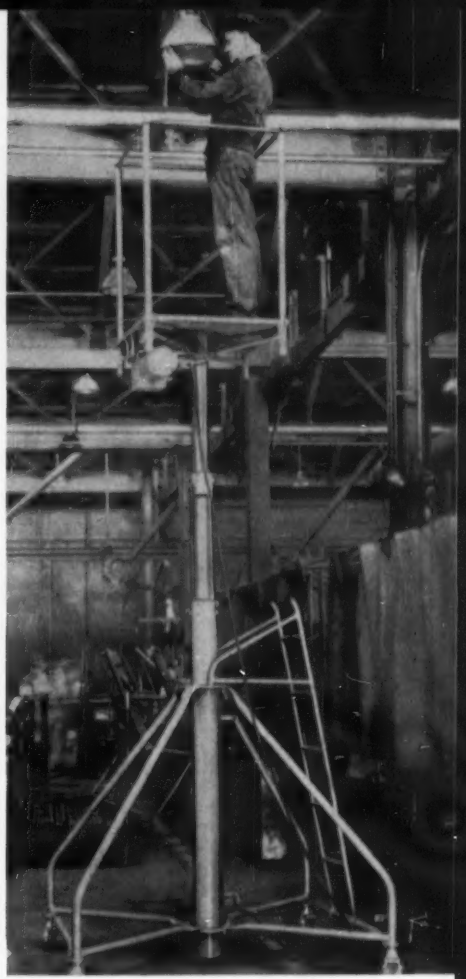
2 Hand Tools, Tower, Record File

GEAR-HEAD WRENCH quadruples normal turning force to 'break' frozen nuts and bolts—Bonney Forge & Tool Works, Allentown, Pa. (59A)



POWER DRIVE speeds pipe threading, cutting and reaming. Strainer and hand-pump catch and re-use oil. —Ridge Tool Co., Elyria, Ohio. (59B)

FINGER-TIP SELECTION of over 40,000 record cards is enabled with new electrical filing system. Pushbuttons rotate cylinder to bring up desired tray. Available in seven models.—Sperry-Rand Corp., New York City. (59C)



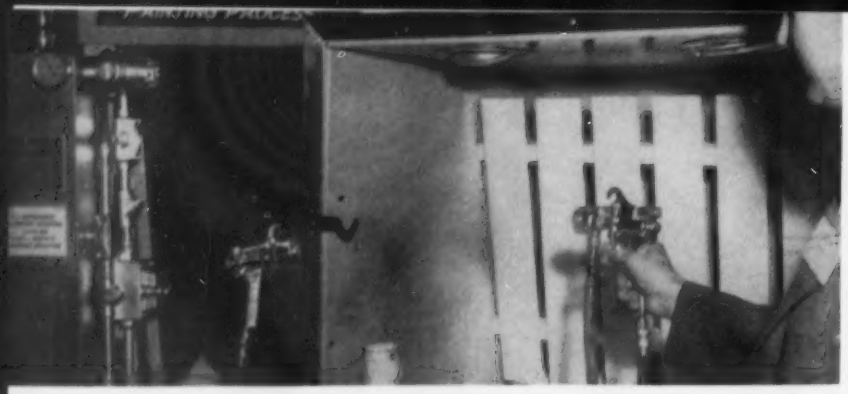
ROLLING MAINTENANCE TOWER features 110 v. electro-hydraulic lift. The 30x30 in. platform rises to 17 ft. —Safway Steel Products, Inc., Milwaukee. (59D)

2 Abrasive Surface Cleaners

ABRASIVE CLEANER is light tool weighing only 11 lb. It needs but a single connection—a ½-in. air supply line. —Clementina Ltd., San Francisco. (59E)

EFFICIENT SAND-BLASTER incorporates vacuum pickup for dust and abrasive. Separator reclaims abrasive and deposits dust in collecting bag.—Vacu-Blast Co., Inc., Belmont, Calif. (59F)

Turn Page for More Units →

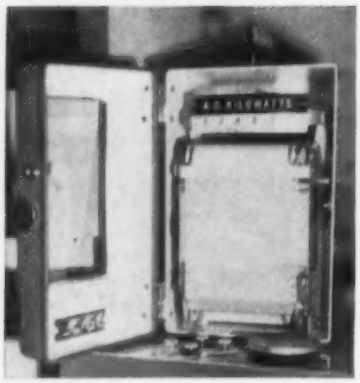


Steam Sprayer

GENERATOR - SUPERHEATER is packaged unit providing steam for spray-painting rig. Hot gas cuts paint viscosity, thus permits use of lower atomizing pressures.—Pantex Mfg. Corp., Pawtucket, R. I. (60A)

2 Instruments, Steam-Trap Units

PREDETERMINING COUNTER has quick-reset lever for zeroing instrument with touch of a finger.—Veeder-Root, Inc., Hartford, Conn. (60B)



PORTABLE RECORDER uses color-coded plastic gears and plastic, 'throw-away' inkwell—General Electric Co., West Lynn, Mass. (60C)

STEAM TRAPS are special high-condensate units in ½- and ¾-in models, for pressures to 600 lb.—Yarnall-Waring Co., Philadelphia. (60D)

4 Floor-Maintenance Aids

VACUUM CLEANERS: Drum-mounted model (left) fits on standard barrel and picks up bulky waste. Explosion-proof unit (right) handles wet or dry debris.—Hild Floor Machine Co., Chicago. (60E)

SWEEPERS: Riding-type, gas-powered sweeper (left) covers 80,000 sq. ft. of floor area per hour. Walking model (right) cleans 40,000 sq. ft.—G. H. Tennant Co., Minneapolis. (60F)

For detailed data on units circle key numbers on Readers' Service Card in back of book

How Organic Chelates Promote Shelf-Life

Your processing can now benefit from their applications—even though reseachers are still probing their mechanisms

IF MANGANESE is added to a refined fat, rancidity is sped. But when nuts contain up to 50 ppm. of manganese along with 30% of fat, they can be stored with comparative safety from rancidity.

And although knowledge of this preserving mechanism is far from complete, it does point up a potent quality-control technique for—

- **Stabilizing fats and oils, and their emulsions, also synergizing antioxidants.**
- **Clarifying wine and other alcoholic beverages.**
- **Controlling "wildness' in beer.**
- **Inhibiting struvite crystallization in canned fish.**
- **Preventing discolorization of sea food and pre-peeled potatoes.**

Paradoxes such as the one above caused food technologists to look into nature's method of controlling ionic and catalytic activity of trace metals in biological systems. The mechanism appears to be an interaction between metallic ions and complexing (or chelating) agents.

Early findings led to wide use of polyphosphates as inorganic chelating agents (see prior article, FE Mar., p. 49), and to citric acid and its esters for protection of ascorbic acid, fats, and oils.

Within the past ten years, attention has focused on an organic compound called (take a breath) enthylenediaminetetraacetic acid—now mercifully shortened to EDTA. Although still finding rather limited use in the food industry, its versatility presages wider application.

This acid's reactions illustrate some of the principles of coordination chemistry as they apply to food technology.

Coordination Complexes

Despite the traditional textbook M^{+x} for metallic ions, they are not in this form in aqueous solution. Anhydrous copper sulfate is colorless, but dissolved in water it assumes the blue-green color of the aquo ion $Cu(H_2O)_4^{++}$. Here, four molecules of water are grouped (coordinated) with the copper.

In forming the cuprammonium ion $Cu(NH_3)_4^{++}$, ammonia intensifies the blue color by replacing water in copper's coordination sphere. Copper also forms a similar complex with triethylenetetramine. Its nitrogen atoms are joined by ethylene bridges to give a ring structure called a chelate.

Any molecule or ion with an unshared electron pair may coordinate with a metal ion. Familiar inorganic examples are cyanide, thiocyanate, and fluoride. Organic molecules may form chelates if they contain two or more groups such as OH, SH, and COOH in proper geometric relation.

Foods contain many such compounds: Polycarboxylic acids (oxalic and succinic); hydroxy acids (citric tartaric, malic, and ascorbic), and polyhydroxy compounds (sugar, starch, cellulose, glycerine, catechol, and inositol). In addition, there are polyphosphoric acids and amino acids.

In its reaction, a metal ion differs markedly from its coordination compound. Compare Cu^{++} and Fe^{++} with their citrate complexes, in which they are parts of negatively charged ions. Copper is a powerful oxidation catalyst, but copper citrate shows greatly reduced catalytic activity. Iron precipitates as hydroxide above pH 4, but in the presence of citrate it will not precipitate even at alkaline pH.

Formation of coordination complexes may be represented by the following equilibrium reaction:

$$M + Y = MY$$

where M is the metal ion, Y the coordinating agent, and MY the metal complex.

The equilibrium constant for this reaction is:

$$K = \frac{(MY)}{(M)\,(Y)}$$

also referred to as the stability or formation constant. Its reciprocal is the dissociation constant, which has the same significance as when used in acid-base dissociation. The larger that K is, the more metal will be complexed, hence less of it will be in the cationic state.

The formation constant of calcium EDTA is so large that it usually is expressed as a logarithmic function. So tightly is calcium bound in this complex that it cannot be detected by conventional analytical techniques, such as precipitation with oxalate. By comparison, magnesium may read-

(Turn to page 188)

More Potent Ones Safe for Foods?

Considering the delicate mineral-chelate balance of the human organism, can the more powerful organic complexing agents be safely added to foods?

Evaluating the available evidence for EDTA, it appears that its use in foods, in amounts less than 100 ppm., does not constitute any health hazard.

Lifetime-feeding experiments with rats reportedly have shown that at concentrations up to 2% on the daily diet, neither disodiumEDTA nor disodium calciumEDTA has detrimental action. At the 5% level, animals exhibited retarded growth, but longevity was unaffected.

No abnormalities were observed on macroscopic or microscopic examination of vital organs of animals fed EDTA at the 1% and 5% levels. Skeletal structure was normal, as was calcium content.

Metabolic studies, employing conventional chemical procedures as well as radioactive-tracer techniques, were made on rats and humans. These tests indicate that about 10% of administered EDTA is absorbed, and that almost all of this fraction is excreted unchanged in the urine.

Other data also show that EDTA is neither significantly metabolized nor accumulated.

It seems, then, that EDTA does not interfere with mineral metabolism when included in diets with adequate mineral content. However, feeding experiments using diets with marginal mineral content indicate that disodiumEDTA or disodium calciumEDTA may accentuate mineral deficiency.

There is some evidence that iron or zinc may be involved, but further work is indicated.

8 Savings by Bagging Cream

With use of the new bag-in-carton system, investment in equipment, supplies, maintenance, and plant operations has been significantly reduced by—

1—Eliminating the mechanical washer, bulk of washing powders and chemicals, investment in cans and retinning, shipping tags, and can-wires.

2—Conserving steam and water.

3—Protecting receiving-room floors from rough treatment, formerly attributed to the heavy cans.

4—Keeping floor, walls, and ceiling neat and dry through elimination of two steam sources—the can-washer and can steamer. Also, less painting is required. Further, the cooler, dryer room adds to workers' comfort.

5—Lowering investment and costs for cream trucks, insulated bodies, licenses, and insurance, while getting more tire life and greater gas mileage.

6—Abolishing lifting and dumping of heavy cans. This makes the work easier, thus improves employee morale.

7—Removing the danger of accidents from cans falling over and lids blowing off yeasty cream. Further, wet floors and consequent slipping are minimized.

8.—Doing away with the scraping of cream from can lids and the steaming of cans for 'steamer cream.'

Bag-in-Carton Cream "Shipper" Piles Up Benefits

Gets better cream, and then butter by delivery from farm to creamery in plastic bags. Saves 50% shipping space, reduces operating costs at dairy and creamery, assures better protection of cream, keeps it cooler

C. F. PETERSON and W. T. HEDSTROM

Respectively, General Manager and Field Representative, Galva Creamery Co., Galva, Ill.

Ever on the watch for ways to improve our Galva Creamery operations, we were particularly intrigued when we spotted a new, very promising method for shipping cream from dairy farms to our plant.

We lost no time in trying it. And when it proved out, we took full advantage of it.

Specifically, this new shipping technique involves use of polyethylene bags, carried in corrugated containers —in place of the conventional 5- or 10-gal. metal cans. The bags (3-mils thick) contain 1¼ gal. (10 lb.) of cream each, and they are packed four to a 200-lb.-test (Mullen) carton (10¼x 10¼x11 in.).

Quality Tops List

In short order, our creamery and the dairy farmers were reaping a number of benefits from these new lightweight "shippers."

Most notable is the improvement in the qualities of the cream and subsequent butter. And such higher qualities, of course, bring higher market prices.

The cream is produced by sanitary methods, and with employment of the bags all possibilities of contamination from rusty, battered cans is abolished.

Further, the air-tight sealed bags prevent adulteration from dust and odors. Also, entrance of insects into the bags of cream is curbed through use of a special protective metal screen in the bag-holder, used during filling.

• Storing and rapid cooling in the farmers' refrigerators while awaiting truck pickup, and then shipping in the heat-resistant corrugated containers, guard against microbial growth. Accordingly our plant can depend on receiving sweet cream. Chances of getting sour, stale, off-flavor, foamy, yeasty, or metallic-tasting cream are rare.

Compared to the familiar metal cream can, the radically new container saves 82% in weight and 50% in shipping space on the trucks. The empty bags-in-box weight is 2½ lb., compared with 14 lb. for the average empty 5-gal. can.

As for the 50% shipping-space savings on the trucks, two stacked 40-lb. cartons (80 lb. of cream) occupy the same space as a 5-gal. can holding 40 lb. of cream.

What's more, the weight reduction has cut down truck operating costs. For the same amount of cream that required a 1½-ton truck for cans now calls only for a ½- or ¾-ton panel truck.

Also, truck drivers with bag cream save about 2 hr. of plant-waiting time over the can method. This is accounted in conserving of the time it had taken to weigh, dump, wash cans, and then reload the empty cans. With the bags, drivers need not wait for empties.

The weighing of the bag cream is simpler and speedier, since all the carrier-cartons weigh the same.

Plant overhead has been materially reduced, with working hours better controlled. During rush days, for example, bag cream can be held over night in coolers and weighed the next morning. This way there's more time for efficient handling of incoming shipments. Also, the work week can now be scheduled so as to eliminate overtime.

Handling on Farm

To get a complete picture of handling by the new method, let's review the operations, first looking in at the dairy farm:

Initially, the farmer places a poly-

ethylene bag inside a metal bag-holder (patent pending). This holder measures 6x10½ in., and it is fitted with a screen and a metal rim that tapers from 6 to 3-in. dia.

Top of the bag is folded over this rim. Then cream from the farmer's separator is run from spout through holder-supported, 40-mesh, stainless steel strainer directly into the "poly" bag. A 1-in.-dia. hole in the bag-holder rim serves as a visual gauge for filling 10 lb. of cream. Rim and strainer are then slipped off.

After goose-neck sealing of the bags with "poly"-strand ties, the farmer usually holds the cream in a standard refrigerator to await pickup by the creamery truck. The four-bag cartons are finally sealed with paper tape for shipment.

Saved, at the farm, are the time and labor of handling, scraping, and washing such utensils as crocks and pans formerly used to store and cool cream. And there are no empty cans to bother with.

Easy Creamery Handling

A highly efficient system of handling the bagged cream has been devised at our Galva Creamery.

Incoming cartons of bagged cream are conveyed over a scale. Since, as stated, the cartons all weigh the same, figuring of tare weight at the scale is no problem.

Each bag of cream is then opened, inspected, and emptied into a steam-jacketed, stainless kettle (10-gal. capacity). Emptied bags are stacked. Then after the accumulation of four such bags, each is then squeezed through a ¼-hp. motor-driven wringer to remove the small amount of remaining cream.

Cream is stirred in kettle, sampled, and graded for butterfat content (basis for farmer pay). A vacuum pump then draws cream from the kettle through a 1½-in. sanitary pipe into a sediment strainer (40-mesh) and detector.

Lid of the sediment detector may be raised for inspection. If there's too much sediment, cream is pump-rejected through a discharge pipe and into a 5- or 10-gal. can. Little bag cream, however, is rejected.

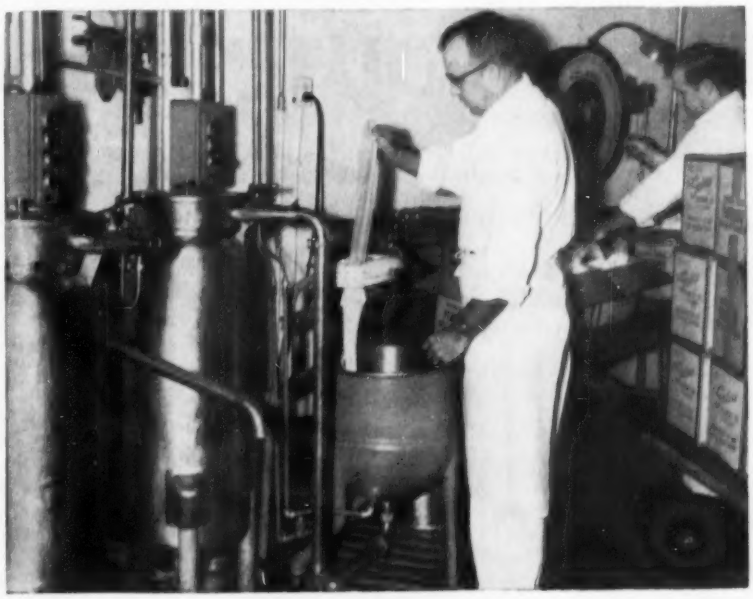
Acceptable cream is pumped into a 300-gal. stainless holding vat. From here, it is pumped through a vacreator and plate-type cooler and goes to a holding vat, then proceeds on to the butter churns.

It is to be noted that the corrugated cartons that carry the bags are re-used 5 to 6 times.

The polyethylene bags are used but once. As for their cost, they run from 2½ to 3c. each.

On the Farm—

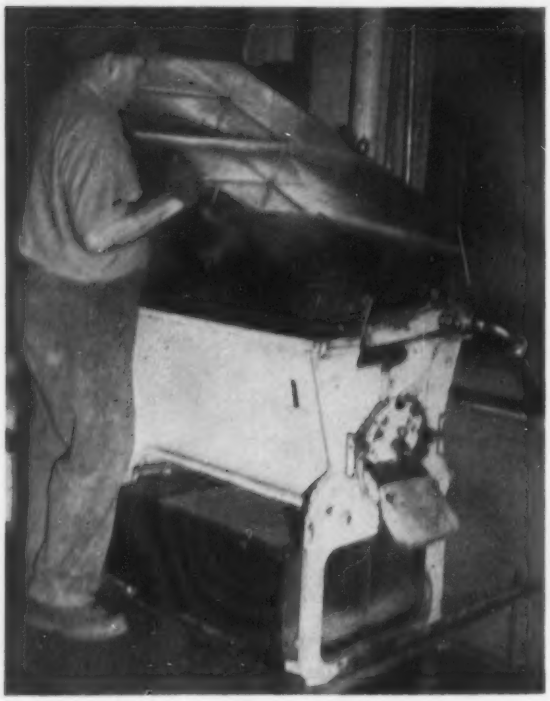
. . . cream flows from separator through 40-mesh stainless strainer directly into polyethylene bag secured in patented, metal holder. Note that there is hole in the rim for gaging filling of 10 lb. of cream. When full, bags are tied with "poly"-strands and packed four to a carton (left), ready for truck delivery.



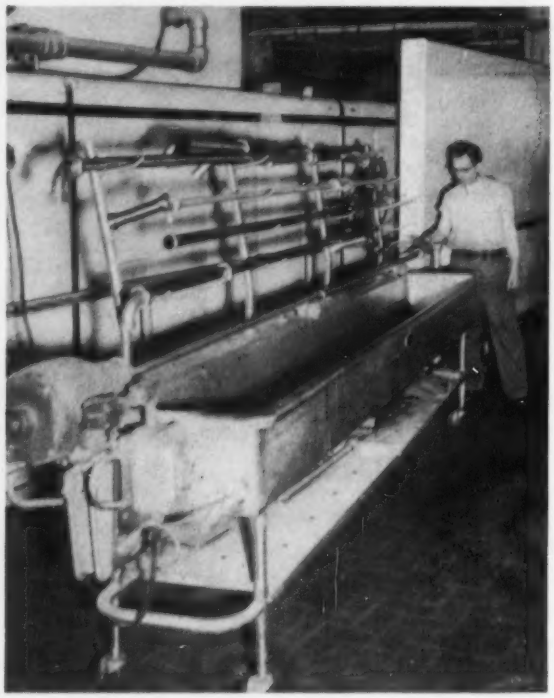
In the Creamery—

. . . bagged product is weighed (rear right), then opened and poured into steam-jacketed kettle (center). Any cream remaining in bag is squeezed out (as shown), using motor-driven wringer. After sampling and grading, cream is vacuum-pumped into strainer and sediment detector (adjacent). Spouted pipe (left) is used for discharge of cream in rare event there is excessive sediment.

1. **RAISIN WASHER** has been entirely rebuilt. Note stainless sanitary dump-top, return basin, and fittings that are quickly dismantled for thorough cleaning. A sanitary pump (not visible) circulates water.



2. **SANITARY PIPING** on continuous mixer is washed on a Sani-Matic unit (Schlueter Co.), commonly used in dairies. Rotating brush (inside pipe) and hot water stream do the job. The handy rack holds pipes and fittings.



These three tough-to-clean units were licked

TRIPLE-DUTY SANITATION

Plant-practical combination of scheduling . . . training . . . inspection achieves top-efficient cleanup and control for Brooklyn bakery

JOSEPH J. HACKETT
Sanitarian, Drake Bakeries, Inc., Brooklyn, N. Y.

A food plant is a fortress that is constantly besieged—by insect and rodent armies.

To combat this foe, the plant sanitarian requires carefully organized forces. First, he must keep his walls tight to prevent a mass invasion. Second, he must stamp out infiltrators before they can become a serious threat.

And here at Drake Bakeries, we strike back with a three-pronged counter-attack: (1) careful work scheduling, (2) rigid employee training, and (3) periodic plant inspections.

We apply these tactics—and make sure they are vigorous—in all phases of plant cleaning, insect and rodent control, and preventive sanitation.

1. Work Scheduling

Certain features of our cleanup schedule influence the overall sanitation program. Production is on a 5-day week and is split into two shifts, each working an 8-hr. day. Sanitation men also work a 5-day week, 8 hr. per day.

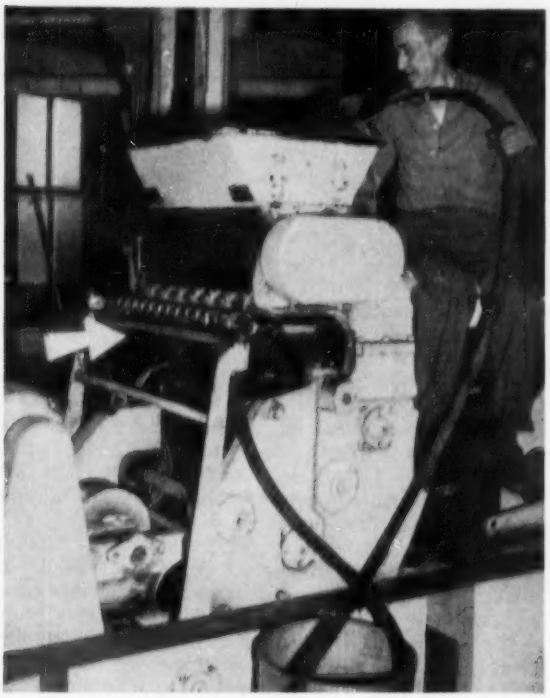
No piece of equipment is operated a second time without first being cleaned. Thus, our general cleanup is concentrated in the brief period between the two shifts, and during the night after the second shift has finished.

▶ **Specifically, we have discovered that in order to keep up with our complete program, 25% of the cleaning must be done during actual production, and 50% accomplished 'behind' operations—starting as each section closes down. The remaining 25% consists mainly of weekly and monthly chores, which we handle on Saturdays when production is shut down.**

For greatest manpower efficiency, we carefully rate the time necessary to clean every piece of equipment. This is done by two methods: Trial and error, and time and motion studies.

A word of caution on the latter method: Regardless of whether these T&M's are made by the plant sanitarian

3. COOKIE EXTRUDER is quickly cleaned with steam. Company-made pan (arrow) catches dough from fine-toothed gears. Pan drain-hose takes waste to a collecting pail. A fine nozzle directs steam jet where needed.



under Drake's . . .

or are contracted from an outside consultant (and we have done both), their purpose should be carefully explained to the employees. That is, workers should not be allowed to get the impression that the tests are designed to cut down on personnel. Rather, they should be told there is so much work that only by the most efficient operation will it be covered with the available manpower.

Individual Job Sheets

In the beginning, we roughly calculated the number of men needed for the cleanup job by adding together the estimated cleaning times for each piece of equipment on a specific floor.

▶ **Operations and times were plotted on a master form. When figures for all floors had been gathered, and times for other sanitation work computed, hours were totalled and divided by 40 (weekly hours per man). This gave us our working force, which now totals 25 men.**

A work schedule is laid out for each man on an individual form (see illustration). He uses this as a working guide. Listed are the specific jobs, the days on which he is to perform them, and the rated job times. These figures are periodically revised as more information is obtained on degree of job difficulty, or when new sanitation methods are adopted.

A master form is kept by the sanitarian for a check on all operations. Weekly and monthly tasks, which may tend to be forgotten, are noted on a separate schedule, and are checked off when completed.

2. Employee Training

At Drake, we believe workers must know why they are doing a job to be 100% effective. Therefore, we hold classes once a week for all sanitation men.

The sanitarian lectures the day men on Saturdays. Night workers are covered in an evening. Depending on work schedules and the amount of material to be covered, lectures last anywhere from ½ to 1½ hr.

▶ **Instruction is divided between two subjects: Special problems or questions that arise on specific jobs, and basic rules of good sanitation that apply throughout the plant.**

In addition, we also aim at production supervisors—constantly alerting them to the need for sanitation-awareness among general employees.

New men on the cleanup team are given extra attention. Each one is always placed with an experienced employee until he "learns the ropes". And his work is carefully checked to make sure it meets our standards.

In this regard, we are aided by the production foremen. All supervisors are expected to note problem conditions in their departments and discuss the remedies with the sanitarian.

One such problem—as old as the industry—is the matter of machines that operate perfectly during the last shift but refuse to budge the next morning. Production men have always charged the cleanup crew—sometimes with justification—for this situation.

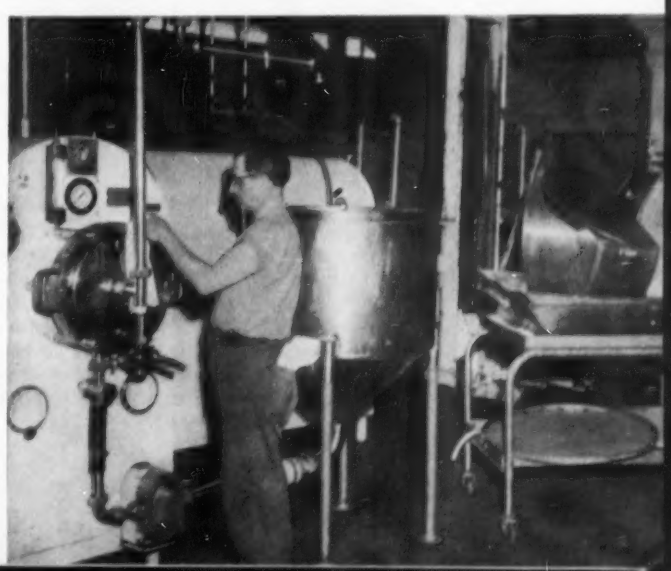
A plan is being considered that would end this touchy problem. It involves having maintenance men perform their servicing directly after the cleanup crew finishes work at 2:30 A.M., instead of waiting until morning.

Defective equipment would be repaired immediately, and thus not be allowed to hold up production.

3. Periodic Plant Inspections

Each morning, before the day shift, the sanitarian spot-checks the plant for general cleanup efficiency and effectiveness of the insect and rodent control measures. Also, he makes a detailed examination of the plant each month, as required by the New York City Board of Health.

▶ **As a cross-check, all supervisors and department heads are organized into two-man inspection teams. These**



DISMANTLED PARTS from continuous mixers are carried to central washing area on portable tables. This also prevents mislaying or mixing parts from the different units.

CLEANING SCHEDULE

(Revised 1/15/55)

Assignment 2

Name J. Jones

Hours 6:00 AM – 2:30 PM
6:00 Rest
10:00 Lunch
1:00 Rest

Floor	To be Cleaned Monday through Friday	Time	Mon.	Tues.	Wed.	Thur.	Fri.
2	General office area	¼	x	off	x	x	x
2	Sweep crumb area	1½	x	off	x	x	x
2	Trash barrels	½	x	off	x	x	x
2	(Bank trip)	½	x	off	x	x	x
2	Handy layer wrapping machine	¾	x	off	x	x	x
2	Handy layer basting machine	¾	x	off	x	x	x
2	Crumb ingredient tubs	¼	x	off	x	x	x
2	Door plate, door glass	½	x	off	x	x	x
2	Coffee cake wrapping machine	¾	x	off	x	x	x
2	Coffee cake dumping table	¾	x	off	x	x	x
2	Mop floor	½	x	off	x	x	x
2	Stools, ladders, sinks, closet	½	x	off	x	x	x
2	Supply room & vault handling	¼	x	off	x	x	x

Floor	To be Cleaned Saturday 7:00 AM – 3:30 PM	Total time	Freq.	Time	1st Sat.	2nd Sat.	3rd Sat.	4th Sat.
All floors	Clean all floors of trash, clean and sweep platform		W	1½	x	x	x	x
B	Elevator pits & window pits		W	1	x	x	x	x
B	Remove raisins from icebox		W	¼	x	x	x	x
B	Elevator floors		W	1	x	x	x	x
B	Elevator shafts		W	2	x	x	x	x
2	Mop floor		W	2	x	x	x	x

WORKING SCHEDULE is made out for each sanitation man. It tells him what to do, and time allowed for each job.

alternate in making monthly examinations of the plant to uncover faulty safety and sanitation practices.

Problems are thrashed out at monthly meetings. And responsibilities for conditions are clearly defined.

General Cleaning

Many problems in our sanitation program are eased by efficient equipment design and processing procedures.

The flour and sugar bins and sifting systems are located on one floor. This eliminates problems found in multi-floor elevators and conveyors.

Extruding machines for cakes are mounted on wheels. So to clean this department, equipment is merely moved to a special wash-up area. And while it is out of the way, the main floor is quickly scrubbed.

Pan and drum washing equipment is concentrated in one section of the 4th floor, where it is handy to ingredient and depanning operations.

We put a germicide (quaternary ammonia compound) in the water reservoir of the wet-band knives used to slice pound cake. This eliminates danger of mold growth.

Sanitation men are assigned to each production section. They work continuously throughout the production period, keeping floor areas clean and cake and crumb pans emptied. These men thoroughly cleanse the lines during production lunch periods, and at the end of each shift.

Insect Control

First step in any insect control plan is to seal the plant. So we constantly check the plant interior—and exterior—for holes and cracks in concrete, tile, and wood. Wherever any are found, they are promptly filled to end an entrance or eliminate a harborage for insects and rodents. ▶ **In this regard, plant 'improvements' can often be just the opposite—as far as insect and rodent control is concerned. When production lines are changed, holes and pits are frequently left where electric, air, and steam lines once ran.**

Our sanitarian and engineer work together to plug such places. If these passages through walls or floor must be left open for future use, we temporarily cover them with tight metal plates.

At Drake, residual insecticides are spread weekly by an outside exterminator. They are used by plant personnel only when active infestation is discovered.

However, we spray oil-based pyrethrins ourselves each week. These are applied with hand, fog, and pump sprayers. Particular attention is paid to areas along walls and under massive equipment such as ovens.

Likewise, drains are a common breeding area for insects. So we check them regularly.

Incoming Ingredients

Probably the main invasion route for insects is incoming dry ingredients. Thus, we check flour, sugar, cocoa, spices, and raisins with extra care—preferably before the shipments enter the plant. Records of these inspections are kept on a form provided by the Department of Bakery Sanitation, American Institute of Baking.

Taking flour as an example, we spot-check 10 bags from every truck load. Truck or rail car interior is also carefully scanned. This is done when the doors are first opened, since many insects shun light and will hide in crevices when allowed time to do so.

In addition, sifter tailings are probed daily. Records of findings are kept on another American Institute of Baking form. All flour and sugar bins are inspected once a week.

Our receiving clerk has been trained in ingredient inspection—not to replace the sanitarian, but to lend a helping hand when work piles up during periods of heavy receiving.

Rodent Prevention

In-plant protection against rodents is largely in the hands of the outside exterminator. Any evidence of mice brings application of Warfarin baits in non-processing areas, and glue boards in other sections of the plant.

Large loading doors are always a big problem. We have three. One opens on a 4-ft.-high shipping platform, and thus doesn't give us much trouble. The other two are ground-level openings used for receiving, and so they are real hazards.

To rat-proof these, we have used two methods. On one door (steel), angle irons were bolted to the bottom, with the flanges extending out on either side of the door. These increase the contact area between door and sill and effectively prevent mice from squeezing through.

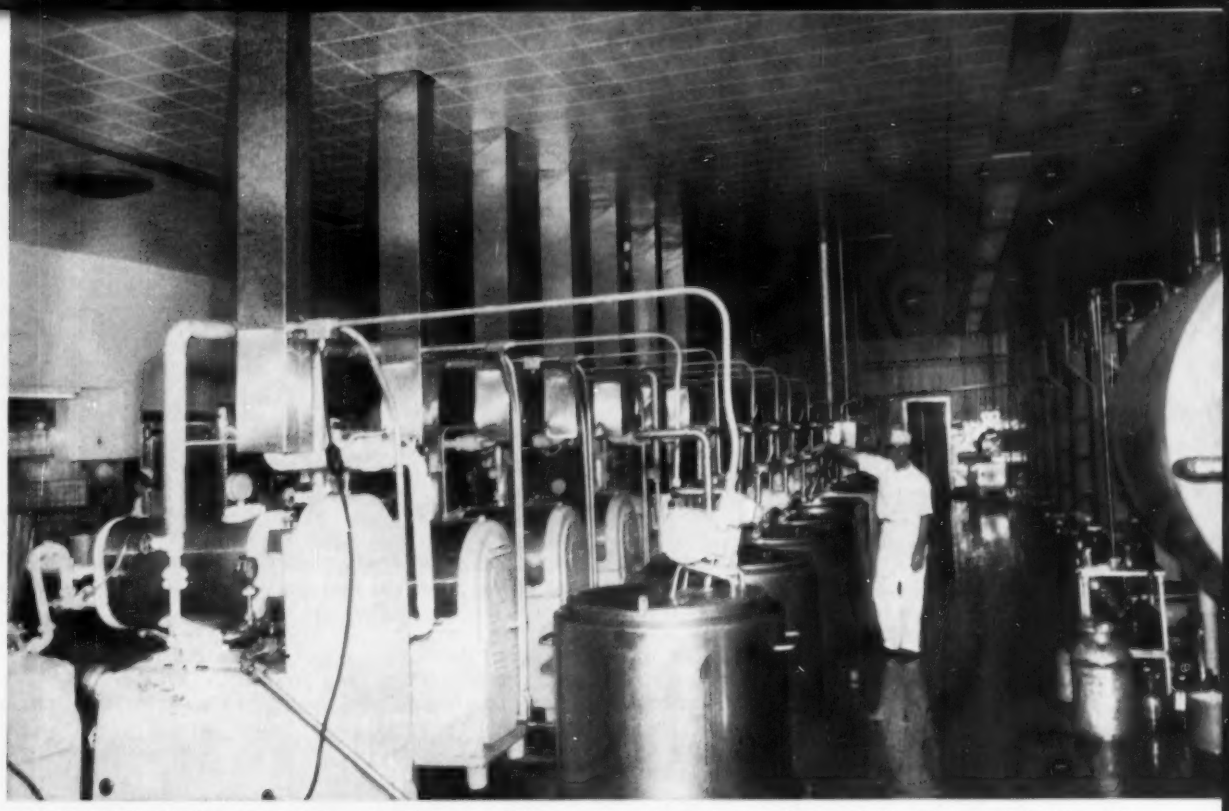
The other door (wooden) is guarded by a wide strip of rubber conveyor belting, attached to the bottom. When the door is closed, this strip is forced out against the sill, making a tight seal.

Most important, the doors are left open *only* when a delivery is being made.

Another danger point is returned cake cartons. These are sorted to reclaim the good cartons, a practice highly desirable from a cost basis, but one which could bring rodents and insects into the plant.

To minimize this hazard, returned cartons are segregated in a special area. Here, they are promptly sorted, and unusable cardboard is quickly removed from the plant.

All cartons are kept, as far as possible, neatly piled to reduce hiding places. And the worker in charge of the area quickly notifies the sanitarian if he sees any insects or rodents.



PROCESSING ROOM of new Arden plant has no windows, air is changed each 6-min. Ceiling is porcelain tile with inset fluorescent lighting. Stainless ducts enclose service lines from headers in attic to freezers. Walls have quilt-pattern stainless 5-ft. wainscoating (rear) extends 5 ft. from floor. Walls above are painted off-white.

Cost-Cutting Innovations Built Into Pace-Setting Plant

West Coast facility features new construction materials, simplified hardening tunnels, labor-saving handling methods and efficient sanitation

HARLYN HINZ and C. R. HAVIGHORST

Respectively, Plant Manager, Arden Farms Co., San Leandro, Calif., and Senior Associate Editor, "Food Engineering"

Mix know-how, imagination, sound engineering, and planning in proper proportions. Then you have the basic formula used to design the new Arden Farms Co., San Leandro, Calif., ice cream plant.

The windowless, air conditioned processing room has many engineering and new materials innovations. Floor is constructed of brush finished, vertical cut tile, with non-skid quality to protect workers from slipping on wet surface. It slopes ¼ in./ft. toward a central gutter 3 in. wide x 3 in. deep.

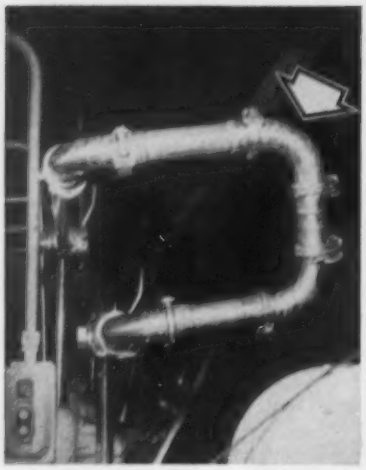
Gutter discharges to main sewer line through four drains, located at 20-ft. intervals, eliminating back-up of wash water. It is covered with U-shaped, perforated stainless steel plates. Drains are covered with larger plates of the same material. Shoulders of U touch bottom of gutter and support top plate at floor level, making it possible to move small wheeled equipment across with ease.

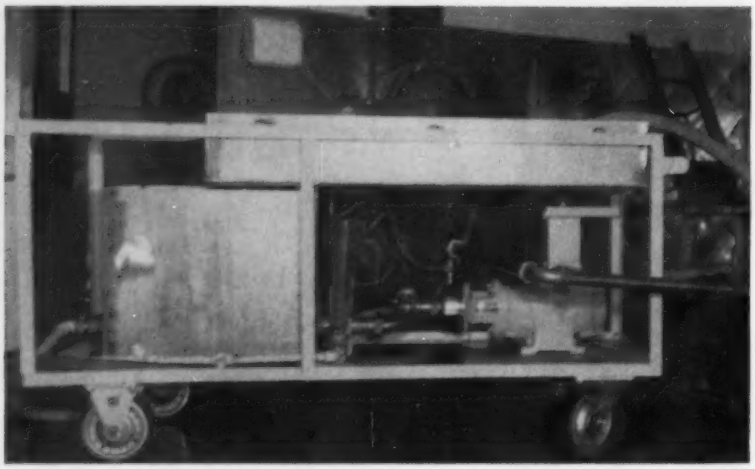
A framework of 2x4-in. redwood was precast in the tilt-up concrete walls. Then 5 ft. square panels of 26-gage stainless steel wainscoating were applied to it. These panels may be taken down when desired by removing a few screws and snapping the panel loose from the stainless batting into which it is clipped. Tile cove at floor fits snugly under bottom of panels. In addition to its aesthetic appeal, this "quilt-pattern" wainscoating and the stainless fixtures afford a high degree of sanitation.

All doors, including power panel and large sliding truck-door, are of stainless. Walls are of concrete, with concrete plaster painted off-white.

Ceiling is formed of zinc-coated steel, baked enamel tiles which are easily cleaned and never need painting. Two 16 in. square tiles are combined to form panels which are clipped together for easy removal when nec-

Cleaning-In-Place Improves Sanitation, Cuts Labor





FOR CIP CLEANING, lines above flavor tanks are connected (arrow), then sterilizer (right photo) is hooked to header in front of mix storage tanks. Note stainless wainscoating (rear).

essary. Fluorescent lighting is inset, flush with the ceiling, eliminating fixtures that become dusty and need cleaning.

All electrical conduits, ammonia lines to and from freezers, air lines, and oil blow-out lines from freezers, are installed in a central duct in the attic. (Working space is provided here.) From the central duct, stainless tubes containing electrical and refrigerating facilities lead vertically to the freezers. Consolidating this maze of piping in sleek, sanitary ducts adds to appearance and cleanliness of the plant. Lines running from them are within easy reach of clean-up crews and can be wiped clean with ease.

Straight-Line Fluid System

Ice milk and ice cream mixes, prepared to this plant's specifications, are transported from Arden's Newman, Calif., plant (FE, Aug. '52, p. 71) by tank truck. Products go into the insulated tanks at 43 deg. F. and arrive at approximately the same temperature.

At San Leandro they are transferred to cold-wall tanks where their temperatures are reduced to 36-38 deg F. Mix operator simply follows set formulas to produce frozen products of desired grade and quality.

A 2-in. line connects all storage tanks with two pumps (one at each extremity of the tank section). Valve in this line separates ice cream mix from ice milk. From each of these pumps a 1½-in. line rises 9 ft. above the floor (to clear worker's heads) and discharges through vertical lines to 100-gal. flavor tanks at the freezers.

The 300-ft. long CIP system is completed by addition of two elbows and a short length of pipe at the end of the parallel run over the flavor tanks. Valve that separates products discharge lines is opened, product tank valves are closed; one product pump is disconnected and an elbow is added to complete the circuit. Second product pump is then disconnected, and the Arden-designed sterilizer is placed in the line.

This mobile unit has a 40-gal. make-up tank providing sufficient head for the pump to develop desired velocity and turbulence of solutions through the pipe system. It contains a 5-hp. pump which was designed to handle acid and caustic solutions. Cleaning solution is heated to 140 deg. F. by an 80 psi. steam injector. Its temperature is thermostatically controlled at this point. Recirculated solution discharges into a reservoir (6 ft. long x 30 in. wide and 12 in. deep), in which short pieces of pipe are cleaned.

When solution has been circulated through the system for the desired cleaning period, valves over flavor tanks are opened and tanks are scrubbed clean, then rinsed with hot water. After solutions have been circulated through the pipe system, it is rinsed with 140 deg. F. water.

New Type Hardening Tunnel

Ice cream flows from freezers to a filling station, which is located only 5 ft. from the hardening tunnel doors. Here packaged products are arranged in specially designed wire baskets, which are stacked (2 wide, 7 high) on knee-high dollies and wheeled to the freezing tunnel.

Designed by Arden engineers, this tunnel requires but one man to load it and another (part time) to unload. Five roller conveyors are employed to move products through it in continuous flow. Each of these conveyors is supported 14 in. above the floor on heavy bench screws. They may be made level or, if desired, sloped in the direction of product discharge or entry. (For easy removal of drumsticks for dipping and bagging subsequent to storage, conveyors are slanted towards process room.) Floor cleaning, underneath conveyors, also is facilitated by this bench screw device.

Tunnel has five sets of double-entry doors with loading chambers between them. When a stack of baskets is accumulated in the loading chamber, it is pushed through the second doors onto a roller conveyor. As subsequent stacks are pushed in they force the others toward the exit doors inside the low-temperature storage room.

All doors, leading to the tunnel and storage room, have electric heating cables built into their jambs.

Air blast, through the freezer, is from the top, down one side-wall plenum chamber, across the product and then (by suction) up through the other side-wall chamber and through the refrigeration coils to the fans.

A turbo-screw pump supplies ammonia to the two coil and fan assemblies located above the tunnel. The 1-in. dia. coil systems are 12 pipes high and 10 deep. Each is equipped with three squirrel-cage fans powered by 5-hp. motors. Motors may be adjusted from 900-1,800 rpm. to provide 30,000 to 60,000 cfm. of −30 to −35 deg. F. air.

Hardening capacity of the tunnel is 800 gph at 1,800 rpm. and −30 deg. F. Slush frozen, packaged product enters at 22 deg. F., exits at −20. When filled, tunnel has 3,200 gal. (800 baskets) of ice cream in residence.

The tunnel requires 30 tons of re-

frigeration at −30 to −35 deg. F., with 10 deg. temperature differential. About 30 min. are required each week to water-defrost the dry coil system.

Materials Handling

Branch plant ordering is simplified, materials handling speeded, and costs reduced by Arden's development of this new basket and dolly method. Baskets are made of ¼ in. galvanized wire, 21¼ in. long, 9⅛ in. wide, 9 in. high. They are designed to hold:

Pints (pail or square)....4-5 gal.
Quarts ..... 5 gal.
½ gallons ..... 4 gal.

A dolly load comprises 112 gal. of packaged ice cream or 336 doz. novelties. A special size basket holding 10-gal. is used for cylindrical ½ gal. packages. The 3-gal. bulk cylindrical paper containers are stacked 48 to a dolly. A corrugated paperboard collar is slipped around this stack to hold it together when loading in trucks.

When hardened, stacks are slid from tunnel exit doors onto mobile dollies in stacks 4 baskets wide and 7 high. Stacks may be made 9 high in temporary storage.

Dollies are fabricated of ¼-in. aluminum alloy, 22 in. wide and 38¼ in. long. Four Darnell 3½ in. rubber-tired, ball-bearing castors are fixed to U-shaped, bottom plates.

The low-temperature storage room and truck loading docks are on the same level, making it easy for one man to transfer a loaded dolly.

The −20 deg. F. ice cream storage room has a capacity of 70,000 gal. of product on dollies. They are arranged by package size, flavor and grade, from which orders are easily made-up.

This area (floor, ceiling and walls) is insulated with Styrofoam (slabs 9 ft. long x 12 in. wide x 4 in. thick). The low "K" factor of this insulation, its permanence, its resistance to rot, mold and moisture absorption determined its selection. A total of 156 tons of refrigeration supplies the needs of this plant.

Truck Loading Simplified

Delivery of ice cream to Arden's branch plants in this area is made by refrigerated truck-trailer. Branch managers now order product by dolly-loads. This has eliminated much paper work and bookkeeping detail. It also makes truck loading and unloading a simple matter.

Two men handle all product in storage and two night-men load the semi-trailers and route trucks.

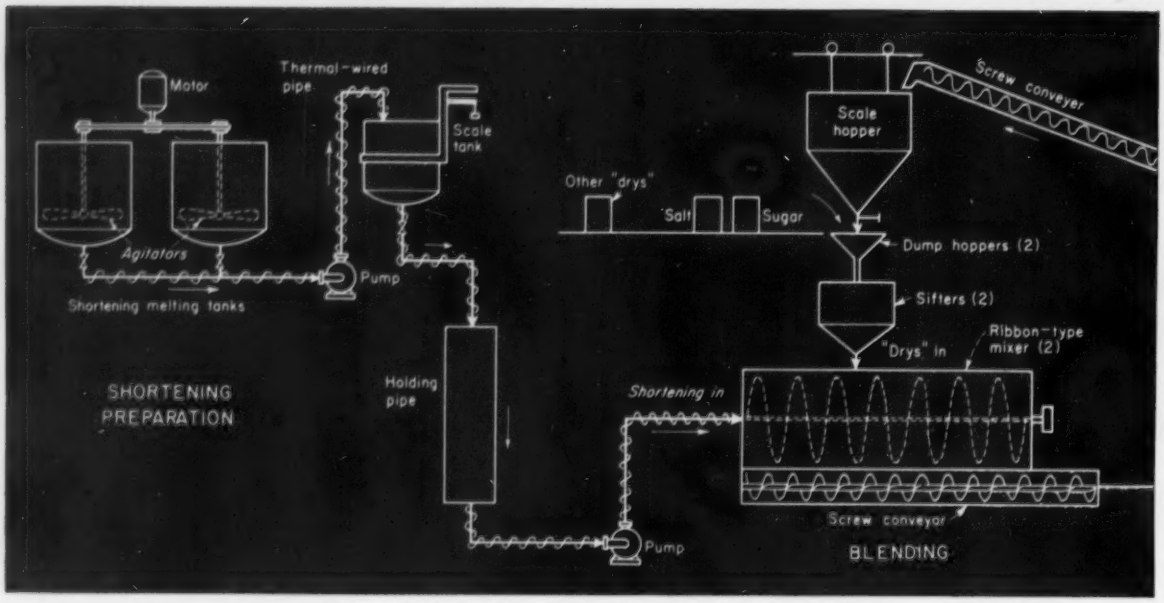
Loaded dollies are wheeled to the dock and onto the 4,000 lb. capacity

(*Turn to page 170*)

Advanced Freezing and Handling Operations

HARDENING TUNNELS (left photo) have roller conveyors on which stacks of baskets filled with ice cream move from processing to frozen storage. Right photo: Stack is placed in loading chamber of a tunnel.

IN STORAGE ROOM, baskets are transferred from tunnels to dollies. For loading on trucks, these are wheeled onto hydraulic tailgates, then positioned in tracks (right photo) which hold them in place during transit.



Robot-Blending of Bake Mixes

▸ **Operates nonstop** ▸ **Produces 15 items** ▸ **Yields quality blends**

JOHN V. ZIEMBA
Associate Editor, "Food Engineering"

"We make up 15 different dry mixes for the bakery trade. To do it, our production line had to be engineered for efficiency and flexibility. What's more, our line had to be set up for continuous production of quality items."

That spells out the objectives achieved by president Tom Naughtin and plant manager Ivan Ressler, of T. F. Naughtin Co., Omaha.

Manufactured by this bakery-supply house are mixes for nine varieties of cake doughnuts, two yeast-raised doughnut, three sweet doughs, and one protein type bread.

Operations cover three floors—for make-up, mixing, and bagging. And only two operators—on make-up and bagging floors—handle them on a continuous basis.

Robot Timing System

Now for a look at these efficient operations.

Two company-installed timers, hooked up to electric circuits, automatically start and stop the shortening makeup line, thereby preventing morning startup delays.

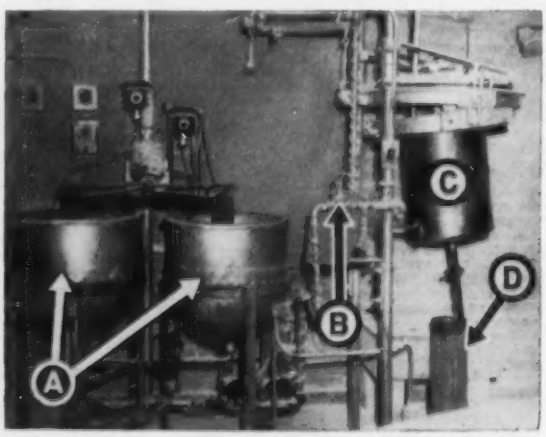
One timer starts up at 4:30 a. m. It supplies current to thermal wires that electrically heat pipelines carrying shortening from steam-jacketed melting kettles to scaling tank, and then to pump feeding mixers.

The other timer opens solenoid valves at 7:30 a.m. to send steam, (reduced to 25 psi. from a normal pressure of 80 psi.) to two 25-gal. jacketed kettles. With a flip-switch in operating position, this timer also starts the kettle agitators' motor. Its 3-way hookup also permits independent operation of the kettles' vertical, propeller-type agitators. Both run off a single ½-hp. motor with belt and pulley drive.

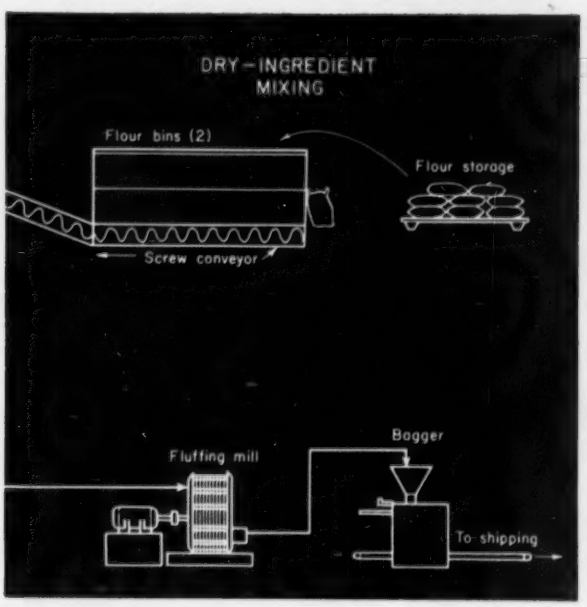
Each timer then automatically cuts off at 4:15 p.m. Timers are preset so that they don't operate Saturdays and Sundays. And a screw set in each unit prevents it from operating on holidays.

Efficient Shortening Handling

Shortening, melted to 150 F., is alternately pumped from melting kettles through pipes to a company-designed stainless steel tank (100-lb. capacity) mounted on a scale.



MECHANIZED scaling of shortening: Timers automatically start heating of kettles (A) and thermal-wired pipelines (B). Melted shortening then enters scaling tank (C), where flavoring is added before it flows into holding pipe (D) for spray feeding into mixers.



STEP-BY-STEP, flow diagram shows efficient straight-through handling of shortening and "drys" in manufacture of doughnuts, sweet-dough, and protein-bread mixes.

Ups Efficiency

▸ Requires only two-man crew

The amount going into scaling tank is preset on a scale beam. When preset amount is delivered, a cut-off switch (Mercoid) stops the pump. Added to this tank at this point are (according to mix formulation) vanilla flavor and the various essential oils such as lemon, mace, and nutmeg.

When valve at discharge of scaling tank is opened, flavored shortening gravity-flows through a stainless steel holding pipe (8-in. dia., 100-lb. capacity) in the 2nd floor mixing department.

Shortening is kept fluid by heating pipelines electrically. Now shortening is ready for uniform blending with dry ingredients in mixers.

Scaling in the "Drys"

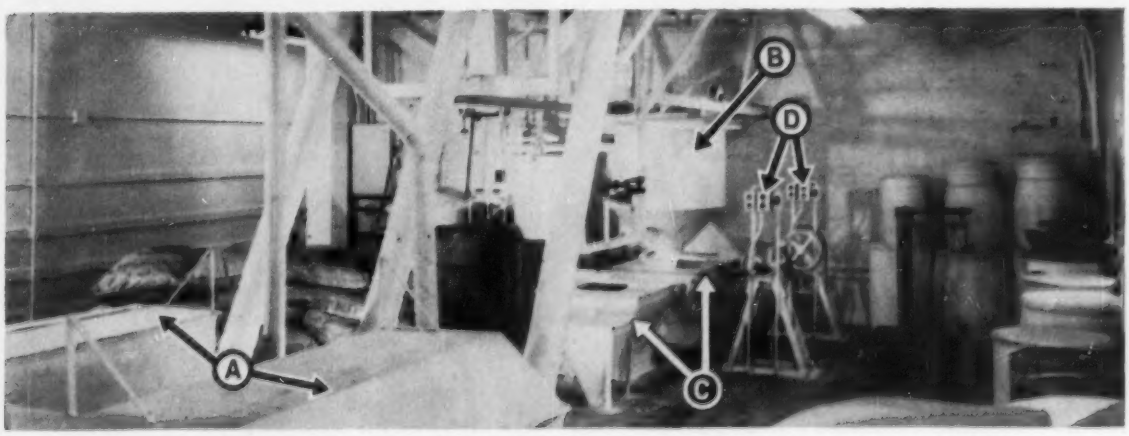
Meanwhile, dry ingredients are "scaled out" on the 3rd floor makeup department for the mixers. Hard and soft wheat flours are separately charged from 100-lb. bags into floor-level metal bins. With weigh beam preset, required amounts of hard and soft wheat flours are alternately loaded into a 1,000-lb. capacity, monorail, traveling-scale hopper. With preset amounts delivered, a switch cuts off the pushbutton-started 5-hp. motor that drives the horizontal and inclined screw conveyors feeding flours from holding bins to scale hopper.

Latter is then alternately railed a short distance, first to one dump hopper and then to another. Scale hopper's bottom slide gate is opened and the flours drop into dump hoppers that feed rotary brush-type sifters mounted above two horizontal 1,000-lb., ribbon-type Day mixers. Remaining dry ingredients—such as milk, egg solids, sugar, starches, and leavening agents—are batch-scaled into fiberboard drums, which are then emptied into dump hoppers.

Operator in 3rd-floor makeup department is now set to blend the drys with flavored shortening. He presses a pushbutton alongside one of the dump hoppers to start the sifter and mixer, and a green pilot light goes on. After running the mixer for 3-4 min., he opens a discharge valve on the shortening scaling tank, then presses another pushbutton that starts the pressure pump to deliver shortening from holding pipe to mixer. At this point an amber pilot light also goes on.

Pump feeds shortening at 80 psi. through a 1¼-in. pipe alone one side of each mixer. Then, through five spray outlets (1/50-in. dia.) inside each mixer, shortening is uniformly atomized on the tumbling batch of dry ingredients. After preset amount of shortening is pumped into

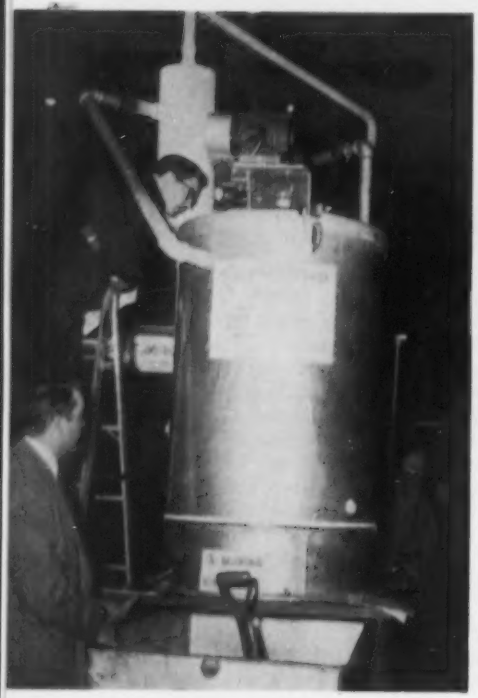
(Turn to page 80)



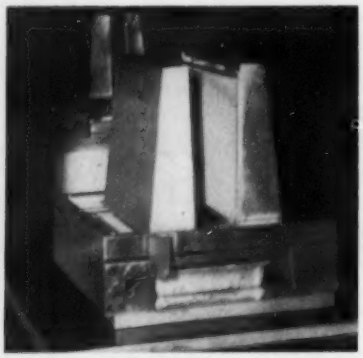
SCALING IN the dry ingredients: Hard and soft wheat flours are conveyed by horizontal and inclined screw conveyor from metal storage bins (A) to monorail-mounted scale hopper (B). Flour is then fed to dump hoppers (C) for delivery to sifters and ribbon-type mixers, which are on the floor below. Other "drys" are batch-scaled into fiberboard drums and emptied into dump hoppers. At point (D) is seen the pushbutton system with which the makeup operator signals the bagging operator that a batch has been properly mixed and is ready for packaging.

11 New Units for "Doing It Better"

Icing, cooking, chilling, handling, packaging, and waste disposal equipment is in focus at Institute of American Poultry Industries show. And highlighted are blood-spotted egg rejector, bird freeze-box, de-feather unit, and bagger

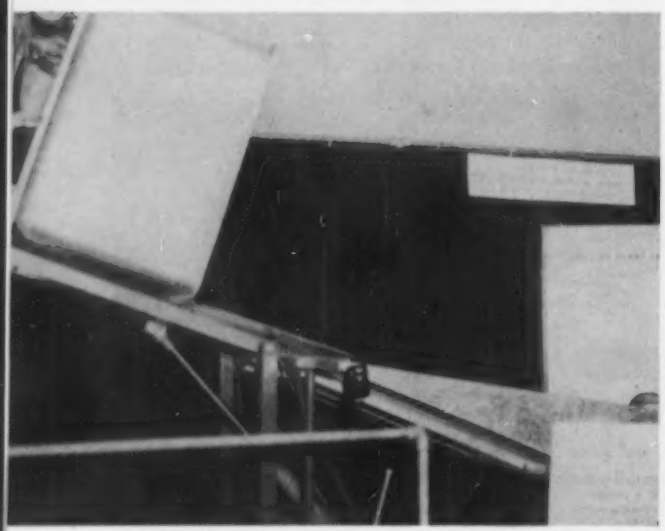


PNEUMATICALLY-OPERATED unit automatically dispenses hopper-fed ice into scaled, crated poultry in preset amounts. Eliminates over-icing, spillage, waste space, congestion, and manual handling of ice. Recommended for briquettes or sized ice. —Morris & Gorrell, Raleigh, N. C. (72A)

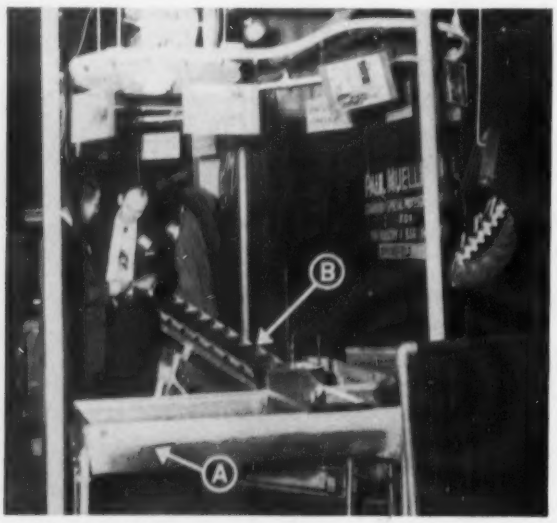


THESE ADJUSTABLE dual-glass plates are high emitters of radiant energy (94-96%). Meats or poultry that are to be cooked are placed in front of these plates, whereupon they receive radiant energy from the glass for a most effective cook.—Electriglas Corp., Bergenfield, N. J. (72B)

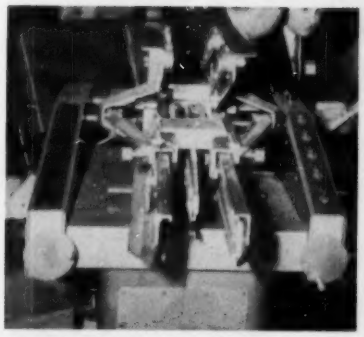
MACHINE makes 3/16-in.-thick chip ice at about $1 per ton. With waterflow cutting off 10 sec. ahead, ice snaps free every minute. This permits ice surface to freeze dry, making chips easier to handle. Available are 9 sizes, ranging 2 to 50-ton daily capacity. Maker: Kent Industries, Inc., Chicago. (72C)



LABOR-SAVING chill-tank tipper (of 230-gal. capacity) transfers ready-to-cook poultry to packing table. Having safety factor eight times average load, it's hydraulically operated and empties tank within 15 sec.—Write USDA, Agr. Marketing Service, Wash., D. C.



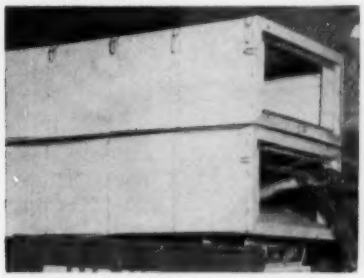
WATER-FLUSHED flow-away trough (A) carries waste into offal-separating conveyor (B). Latter features continuous series of smooth, perforated pans to reduce cleaning of entangled loose fibers. Manufacturer: Paul Mueller Co., Springfield, Mo. (72D)



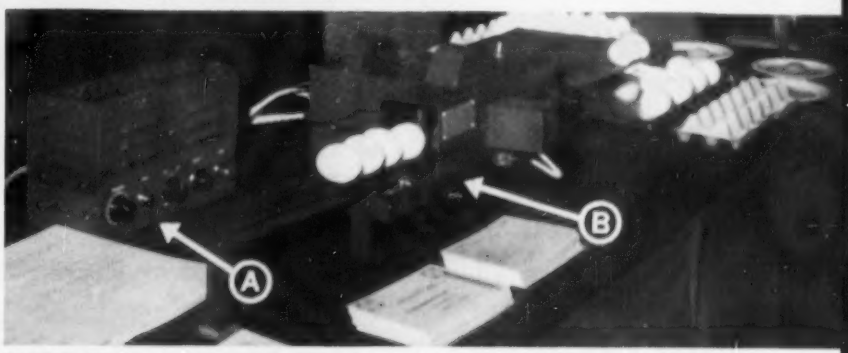
PORTABLE, lightweight machine overwraps tray-packed poultry and parts with heat-sealable film at rates up to 1,200 per minute. Height, width, and type of folds are automatically adjusted. Displayer: The Albright Co., Chicago. (73A)

CHAIN-DRIVEN, rotary clean-out scraper (A) automatically removes burnt breading and other particles from continuous fryer. Particles drop into 50-gal.-capacity metal bin (B). Fried, breaded poultry chutes onto transverse conveyor carrying it to latest continuous, built-into-line cooler (C).—Downyflake Div., Doughnut Corp. of America, NYC. (73B)

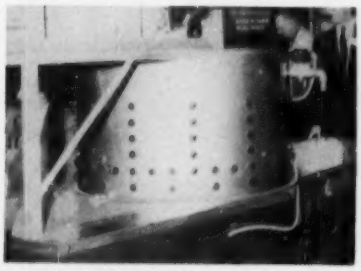
4 Poultry-Field Specials



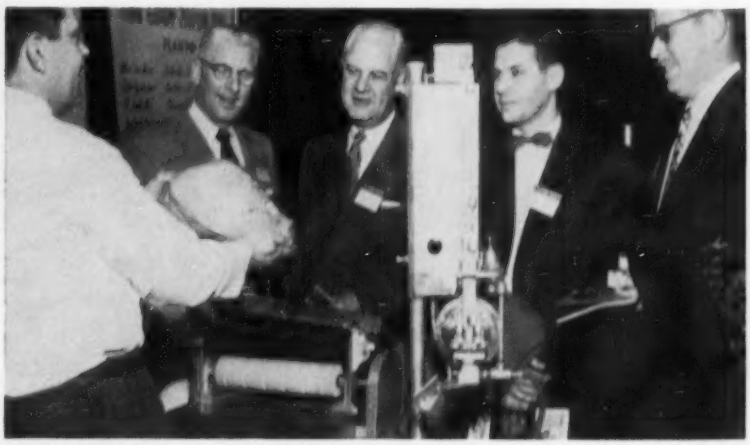
SPECIALLY-DESIGNED wirebound boxes serve as freeze racks—fiberboard ends being removed for quickly and evenly freezing packed poultry. Inexpensive ends are then simply and speedily snapped into position and staple-secured after freezing. Blown-streamers (lower box) illustrate aeration. Displayer: Wirebound Box Mfrs. Assn., Chicago. (73D)



THIS ON-LINE blood-spot detector automatically inspects eggs at rate of 120 a minute, rejecting defective ones from conveyor. Unit comprises electronics decision unit with power supply (A) and transport and optical assembly (B). Food Systems, Inc., Oakland, Calif. (73C)

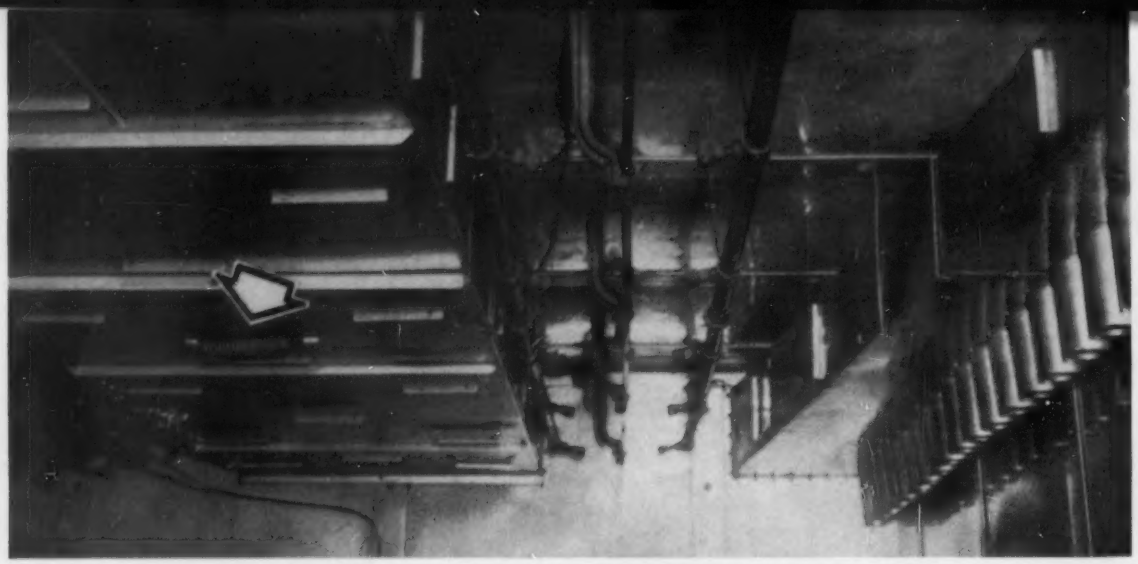


CENTRIFUGAL unit de-feathers 8-13 fryers and 10-15 broilers at a time. Precision-timed controls operate on-and-off water sprays during dressing cycle. Door opens automatically to discharge birds. — Pickwick Co., Cedar Rapids, Ia. (73E)



NEW "ROLLING" process replaces vac line and equipment for removing air from polyethylene bags of turkey, also hot-dip tank for tightly stretching bag over packaged bird. In packing, bird is slid, hocks first, into bag from chute after tail is bent into body cavity. Bag neck is inserted between grooved rubber rollers that pull film tautly over bird to expel air. Displayer: Herb Shelly, Inc., Farmington, Minn. (73F)

For detailed data on units circle key numbers on Readers' Service Card in back of book



ON CEILING in latest smokehouse are: Two inlet ducts (as at right) that introduce smoke, steam, and hot air; spray pipes (as at center); and exhaust duct (left). Dry-bulb (arrow) and wet-bulb thermometers actuate humidity and temperature controller. Sliding ports enable sanitation men to quickly clean interior surfaces of ducts.

Packer's Ingenuity Sparks Advance in—

3-Way Smokehouse Design

New layout licks engineering problems of smoking, cooking, and showering in a single chamber . . . Ups processing effectiveness . . . Eases sanitation

ROBERT J. KELSEY
Assistant Editor, "Food Engineering"

They've done something new to up meat-smoking efficiency at New England Provision Co., Boston.

Known previously for its economical processing of meat products (FE, May '53, p. 69), the company now has taken another forward step with installation of four, 6-cage, air-conditioned Atmos smokehouses.

Such stainless steel units are not new to Nepco. For it has operated 10 similar smokehouses for the past three years. And with them developed the unique method of making smokehouses serve triple duty—for smoking, cooking, and showering.

But knowledge gained in installing and operating this first equipment has been put to good use in the new houses. Notable advances are seen in floor, duct, and control design, as well as in overall ease of sanitation.

At this plant, smokehouses are on the second floor, where they tie in best with other processing operations from the standpoint of meat-handling costs.

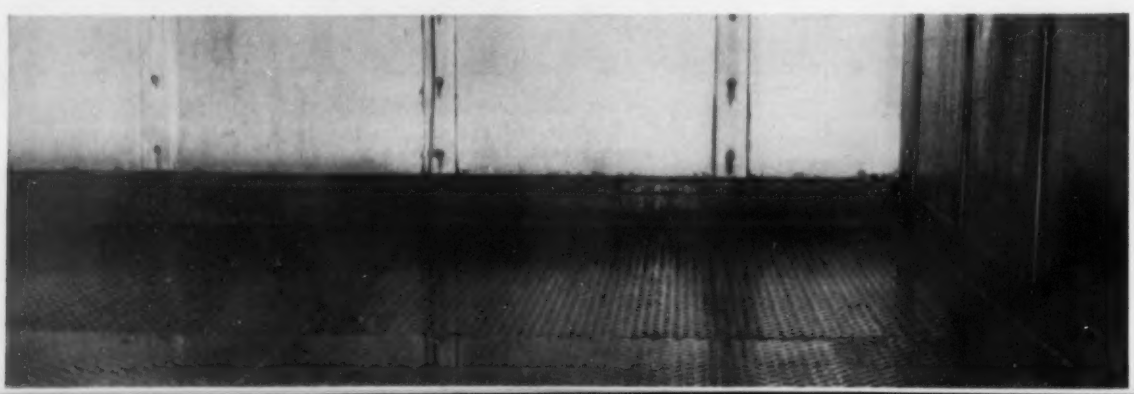
But such a location poses the serious problem of water leaks when smokehouses are used for showering.

In the original installation, a solution to this problem was sought by first laying down 4-ply tar paper. The waterproof layer was then topped with a brick floor, to which the smokehouse was fastened.

Solves Leakage Problem

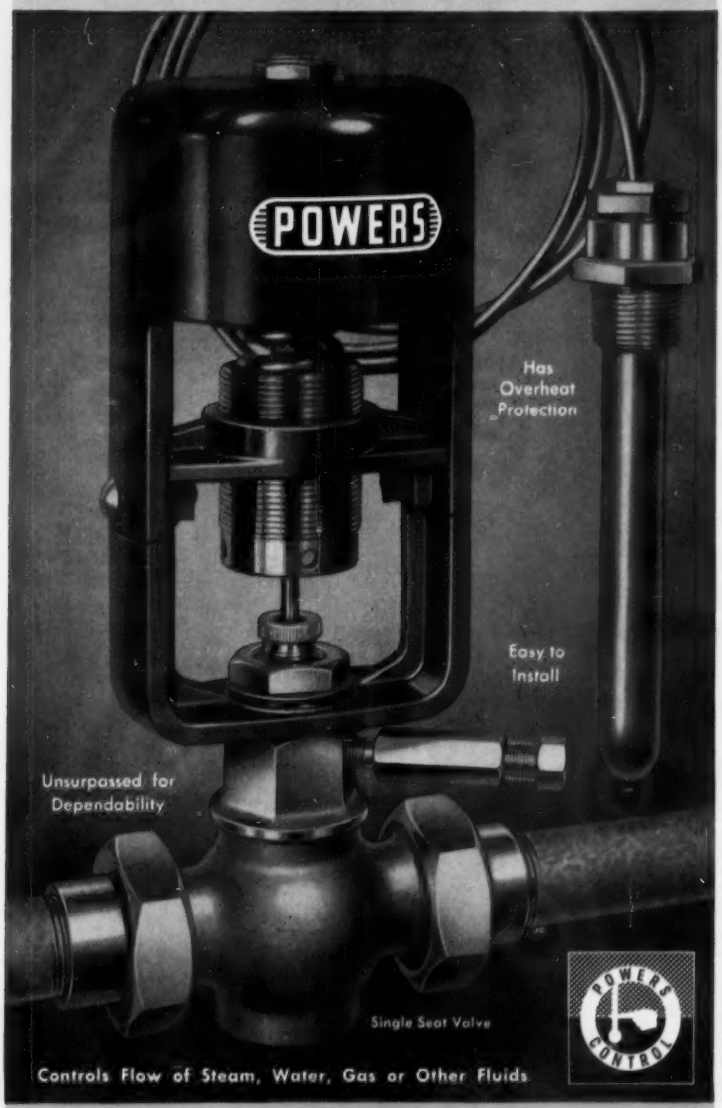
Even with this protection, leaks developed. Rapid expansion and contraction of the floors—brought about by spraying cold water into the 180-deg. houses—cracked mortar between the bricks. And because houses were firmly

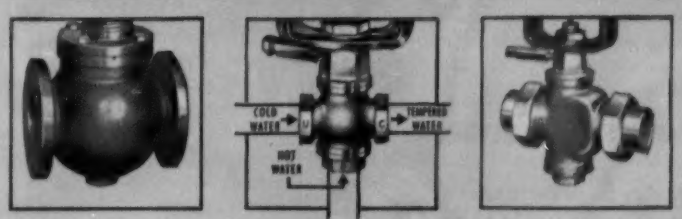
FLOOR is specially formed of welded steel plates to stop leaks. Stainless walls extend down over curb protecting glass-fiber insulation. Clearances between curb and walls allow floor expansion without buckling.



POWERS No. 11 Self-Operating TEMPERATURE REGULATOR

Automatically holds temperature constant at the right point. Prevents losses caused by wasteful OVER-heating.

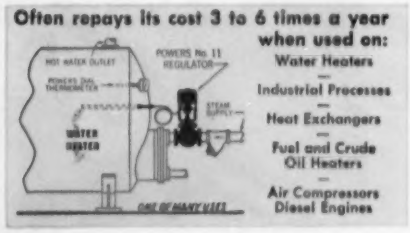




Various Valve Bodies and Inner Valves are available. Single and Double Seat Valves thru 2" have rugged bronze bodies with bronze union connections for quick, easy installation. Bulletin 329 gives information about all types.

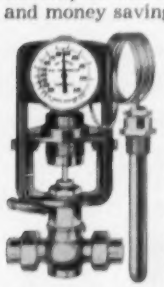
(e88)

Why It Gives BETTER CONTROL and Saves More Money



ONLY POWERS No. 11 REGULATOR Offers ALL These Advantages

- **Simple, sturdy construction.** Materials used are corrosion resistant.
- **Powers bellows has 50% more power** than used in the majority of regulators. The heart of a self operating regulator is its bellows. Powers with its 50% greater effective area gives better control and its durable 2 ply bellows outlasts ordinary single ply bellows.
- **Valve stem lubricator** with silicone grease aids easy movement of highly polished stainless steel valve stem and reduces drying out of packing.
- **BETTER CONTROL** results from Powers powerful bellows and minimum of valve stem friction.
- **60°F. temperature ranges** available with accuracy of ±1°F. on some processes and 2 to 3°F. on others.
- **Rugged bronze valve bodies with bronze union connections,** for single and double seat valves thru 2", reduce installation time and labor. Larger sizes have flanged iron body valves.
- **Powers Nationwide Service and 24 Hour Delivery** in the U.S.A. are important time and money saving advantages.



- **Indicating Regulator** with easy to read 4" dial thermometer helps adjust the regulator and check temperature at the bulb. Various dials and ranges are available.

Right type and size of valve is important for good control. May we help you make the right selection? Benefit from POWERS more than 60 years experience with self-operating regulators.

Call our nearest office or write us direct for Bulletin 329.

THE POWERS REGULATOR CO.

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Established 1891

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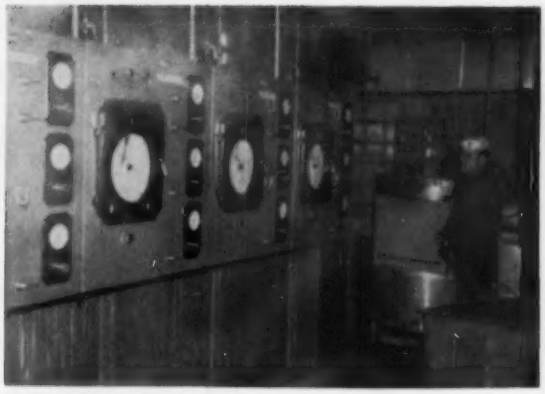


MAIN CONTROL PANEL regulates four houses. Switches activate wet and dry heat (3-way valves), smoke valves (water-filled), fresh air dampers, and exhaust. Push-buttons start charts and blowers. Smoke generator is at right.

COMPACT HEATER behind house holds main blower, steam coils, and steam-injection nozzle. Fresh-air damper (arrow) is operated by pneumatic regulator and controlled from gage board. Motor and eccentric (top) run smoke damper. Doors and panels permit easy cleaning.

tied to the floor, they warped out of true with each change in floor size.

Profiting from this experience, company engineers developed a new type of base for the latest houses. And it has proved itself 100% waterproof over a period of constant operation.

Formed from welded sheets of ¾-in., diamond-checkered steel plate, the new floors literally float. They are turned up at the edges, forming curbs that fully contain the water. Each smokehouse is attached outside this base to the brick floor of the building. Inside surface of the smokehouse wall extends down over the steel curb as a seal. Suitable horizontal and vertical clearances allow steel plate to expand and contract freely—without cracking and buckling itself, or distorting the smokehouse structure.

A drain, welded into one corner of the floor, removes water during showering and clean-up operations.

Smoke House Facts

Company engineers discount the problem of smokehouse heat-up time with showering. They point out that while such a problem is acute in brick or tile structures, the all-stainless chambers, which are insulated with 2 in. of glass fiber, do not "soak up" nearly as much heat.

Also, heat-up and cooking times are both reduced by using high steam pressure (80 lb.) in supply lines to the heating and steam injection machine.

So smokehouse warm-up is only a matter of a few minutes. This time, say company officials, is more than offset by the economies in space and meat-handling costs obtained through triple processing in a single chamber.

Further evidence of three-way savings is seen in the smokehouse ducts. They serve not only to feed smoke and hot air, but steam, too. Extra steam pipe for cooking thereby is eliminated.

Also, passing steam through these ducts during each cycle is said to keep them much cleaner, reducing clean-up time at the end of the day.

Each house is equipped with two feed ducts that are attached to the ceiling, one on either side of the chamber. These ducts diminish in size toward the front of the house to insure even spread of smoke, air, or steam throughout the chamber.

A large exhaust duct is located in the center of the ceiling and is provided with numerous sliding panels. These are adjusted to get an even temperature in all parts of the house, and then are fastened in place to prevent accidental shifting during clean-up.

Four water pipes (each with six spray heads) also are attached to the ceiling, and provide complete shower coverage of the house interior.

Particularly emphasized by company engineers is floor-level installation of smoke-generating and steam-heating equipment. This, they say, makes clean-up and maintenance much easier than when such units are overhead.

A single new generator (Mepaco) turns out smoke at the rate of 7,200 cfm., and easily supplies the four houses. This modern unit contains a safety thermocouple that stops the sawdust feed, as well as the blower, if the combustion chamber temperature becomes too high.

To control fly ash and sparks, smoke is discharged downward from the generator against the surface of water in a pan that is built into the smoke duct.

Smoke flow is positively controlled by water valves (FE Feb., p. 71) that are filled to seal off unused houses. When valve is drained (permitting smoke to enter house), about 2 in. of water remains in the valve tank. This serves as a further guard against sparks and ash.

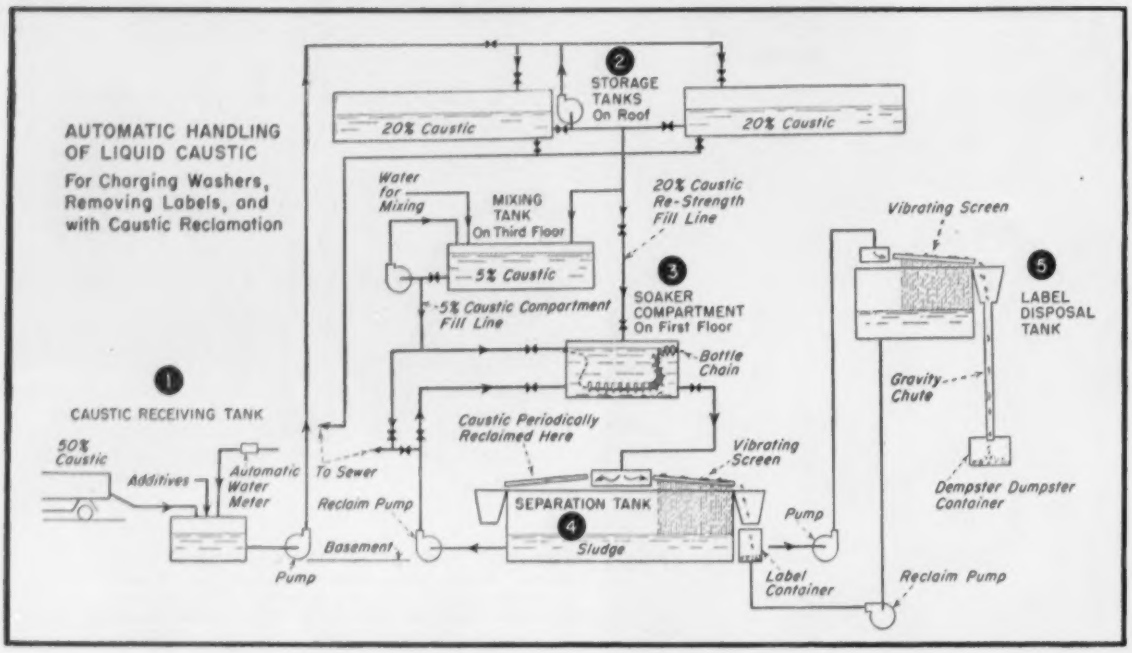
Compact Heating Units

Heaters, built by Atmos, are located behind each smokehouse. These contain 20-in., triple-duty fans that force air through steam coils for heating the houses, blow live steam into chambers for the cook, and recirculate smoke during the main processing period.

A damper, on blower's suction side, admits fresh air for venting houses between operations.

Live steam (for cook) is injected

(*Turn to page 206*)



Washing of Bottles With Caustic Made Safer-PLUS*

✻ You get the big PLUS in worker protection by switching from flake to liquid caustic and then handling it in an automatic system. In this way, Schaefer Brewing has abolished the dangerous manual charging of soakers. And it has also mechanized the old messy job of removing label-sludge from washers

BRUCE HACKSTAFF

Vice-President and Director of Plant & Production, The F. & M. Schaefer Brewing Co., Brooklyn, N. Y.

Astute engineering, in the form of an automatic system for handling liquid caustic soda, has made bottle washing a decidedly safer and much more efficient operation at The F. & M. Schaefer Brewing Co., Brooklyn, N. Y.

Designed and installed by company engineers, the new system has solved a knotty two-fold problem.

First, there was the hazard and inconvenience of handling drums of flake caustic used to charge the washers. Delivered by truck, they tied up a shipping dock for unloading, and required considerable space for storage.

But far more disturbing to Schaefer's safety-conscious engineers was the routine in which a five-man crew manually charged each of eight washers with flakes. This involved hand-trucking of a drum to the machine, then weighing out the flakes into rubber pails. Latter were passed in bucket-brigade fashion to a man atop a ladder, who charged the compartment. Then the crew moved on to the next washer.

Naturally, these men wore protective gear. But that served also to make the operation more cumbersome. And there was another serious objection to use of flakes: It made control of solution concentration in the washer difficult, since the flakes tended to stratify in the compartments.

Second came the problem of removing washed-off labels from the units, requiring a 1-hr. shutdown per machine. The smaller washers were emptied every 8 hr., the larger ones after 16 hr. of operation. Labels were raked and shoveled out, some 30 barrels being collected daily. Then the 300-lb. barrels had to be hauled about 600 ft. to be emptied into a Dempster-Dumpster container, which when full, was carted to a nearby dump.

However, the new liquid-caustic setup has simplified the entire operation—with these noteworthy advantages:

1. Dangerous manual handling of the corrosive caustic has been abolished.

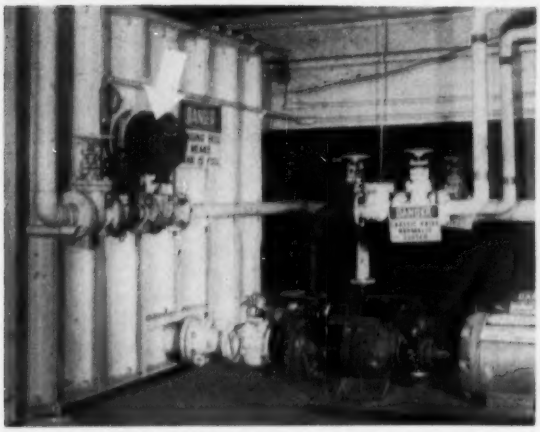
2. Label disposal is now virtually automatic.

3. Maintenance of proper alkalinity in the washers is now continuous.

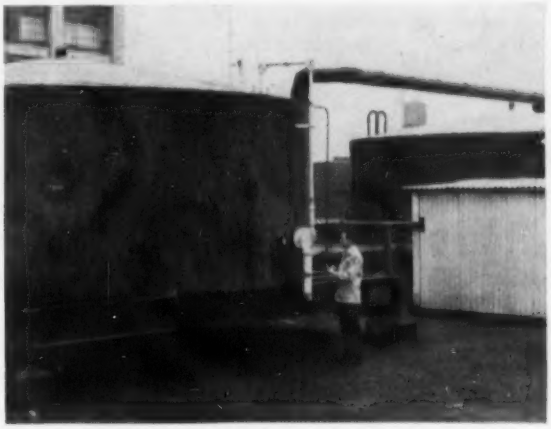
4. Equipment shutdowns have been eliminated.

5. There is a saving of space, formerly required for storage

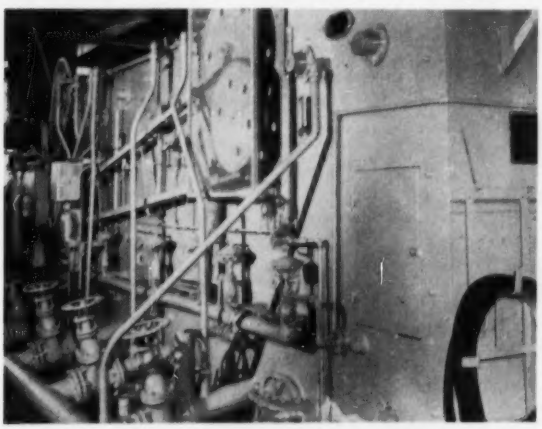
CLOSEUP OF MAJOR COMPONENTS
(Numbers in Diagram Key to Photos)



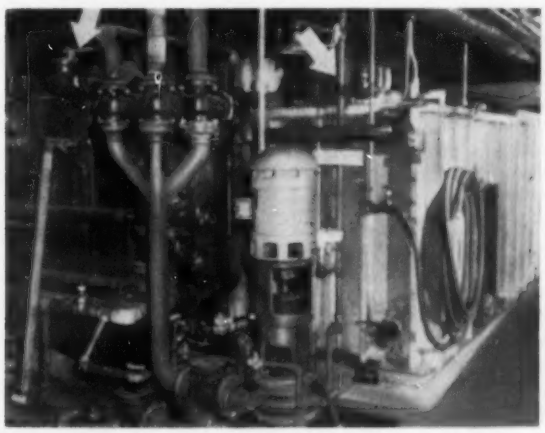
1 RECEIVING TANK. It is surge unit in which 50% liquid caustic soda is continuously diluted. Water enters through automatic meter (arrow). High-low probes in tank control pumps that send diluted caustic to . . .



2 . . . ROOF-TOP STORAGE TANKS. They are checked daily for solution temperature. Caustic is held at 90 F. by internal steam coils. Shed (right) houses pumps and controls for proper mixing by recirculation.



3 BOTTLE-WASHER COMPARTMENTS. They have 6-in. lines (lower left) through which labels and sludge are automatically flushed from the washer. The conveying medium is caustic that has been reclaimed in



4 . . . BASEMENT SEPARATION TANK (right). Here, pulp-like labels are removed by vibrating screens (arrows). Labels are slurried with water in vat (left), then sewage pump (center) moves them to . . .

of the caustic drums and barrels for the washed-off labels.

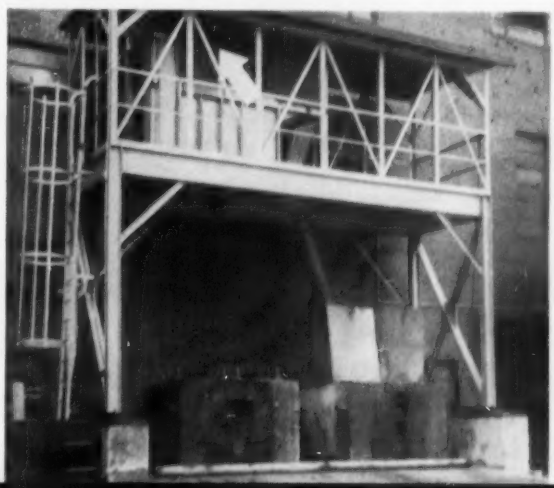
Here is how the system operates from receipt of caustic to final label disposal.

Caustic Handling

Liquid caustic (50% solution) arrives by tank truck, with three shipments supplying the "working quantity" of some 8,000 gal. The caustic is subsequently diluted to a 20% solution and stored in 30,000-gal. tanks on the roof.

Earlier, chemical additives (for preventing formation of scale in the washer and to enhance the bottle-washing action of the caustic) are pumped to the roof tank that is to be filled. Additives are pumped from drums (see diagram) into a 2,000-gal. caustic-receiving tank in the basement. This tank has high-low level probes which control the operation of its pumps. Since the volume of additives would hardly fill the line to the roof tank,

5 . . . OUTSIDE LABEL-DISPOSAL SYSTEM. At this point, label slurry is dewatered on vibrating screen (arrow). Labels drop through pivoting chute into Dempster-Dumpster container. Water is recirculated.



water is metered into the receiving tank to keep the pump running.

With the additives in, an operator then begins pumping the caustic to the same level-controlled tank previously used to move the additives. Simultaneously, the diluting water is automatically metered into the tank and mixed with the caustic solution. The mixture then goes to the roof tank, followed by sufficient water to wash out the lines and yield a 20% solution.

This particular 20% solution was chosen because it offers the lowest freezing point of any caustic solution —an important factor in outside storage.

Although this 20% caustic freezes at −27C., the roof tanks are fitted with steam coils and all exterior piping is steam traced. In addition, tanks are interconnected for recirculation.

As a special safety precaution, a direct line to the sewer permits quick emptying of tanks in case of fire.

Since caustic is used as a 5% solution in the washer, 20% solution is diluted to that figure in an 8,000-gal. tank on the third floor. This serves as a source of caustic for charging the washers—by gravity, eliminating the former manual routine.

The 5% solution is easily made up by liquid-height differential. Water is run into the tank to a given height, then sufficient 20% caustic is piped from the roof supply until the level in the tank reaches a point calculated to give the desired concentration. Mixing is by recirculation.

Remainder of the 20% caustic is used as makeup for caustic being continuously removed in the bottle-washing operation. It is drip-fed from the roof tank directly into the first compartment of washers on the first floor. Carry-over of caustic from the first compartment keeps all others at required strength. Adjustment of a needle valve provides the volume of caustic needed. A solenoid control shuts the valve when the washer is not operating.

Discharge is fairly constant, since change in head, as the level of caustic in the roof tank falls, is only a small part of total head on the washer.

Label Disposal

All soaker compartments are on a rigid time schedule. And label removal is now practically automatic.

Key to the system is a 5,000-gal. rectangular tank in the basement, which was adapted as a label-separating and caustic reclamation unit. Mounted above this tank are two vibrating screens that receive a caustic slurry of pulp-like labels and sludge from the washer. While caustic solution and sludge fall through the screen into the tank, labels discharge into two 500-gal. vats at either end of the tank.

Sludge in the caustic settles to the bottom of the reclamation tank, leaving a clear solution, which is pumped back to the washer. With added 20% caustic to bring its strength up to 5%, this solution is ready for further bottle washing.

Since solids suspended in the caustic are not removed by screening, they continue to accumulate in the bottom of the reclamation tank. Therefore, this sludge is pumped to the sewer twice a week. Fresh caustic is piped to the washers from the 5% storage tank on the third floor as needed.

Completing the system is a 1,000-gal. tank located several hundred feet from the caustic-reclamation tank. It is mounted above two Dempster-Dumpster containers and has a vibrating screen that discharges into either container by means of a pivoting chute.

Here is how labels are removed from a compartment:

An operator merely opens a 6-in. gate valve at the side of the compartment, and also a set of nozzles on the opposite side. Then pushbuttons activate pumps in the rest of the system.

As caustic slurry flows out of the compartment, it is replaced by screened caustic from the basement tank. Injecting this solution through the set of nozzles creates, in the lower level of the compartment, a turbulence that moves the labels toward the 6-in. outlet.

They flow into an 8-in. header and down to a weir box, which discharges onto the screens of the separating tank. Purpose of the weir box is to trap any broken glass, which would interfere with subsequent pumping of the label slurry.

Labels, minus caustic solution and sludge, travel the length of the vibrating screen and fall into the vats alongside the tank. Here, they are slurried with water and pumped to the screen of the 1,000-gal. tank above the disposal containers. A sewage pump is employed for this conveying.

Dewatered by the action of the vibrating screen, labels drop into the chute that feeds the trash containers. These are periodically carted away for dumping, while the water that falls through the dewatering screen is recirculated.

Control of Alkalinity

Caustic concentration in the washer is regularly checked by a Wheatstone bridge stationed at each machine. Since this conductivity test indicates only total ionic strength, a final determination of free caustic is made by titration in the laboratory.

Another important test is for aluminates, which can precipitate as sodium aluminum silicate—a particularly tenacious scale. Normally, aluminates are kept in solution by use of additives, but this check gives advance warning of a buildup.

Robot-Blending of Mixes

—*Continued from page 71*

a mixer, a switch shuts off the pump and turns off the amber pilot light.

Mixing continues 22-27 min., depending upon amount of shortening going into the dry mix. Sounding of a preset alarm clock signals desired mixing time.

Makeup operator then flips a switch, thus changing his pilot lights from green to red, and the bagging operator's from red to green. This indicates that batch in mixer is ready for packing into bags.

Bagging operator next flips a switch to change his pilot lights from green to red and makeup operator's from red to green. Signal is for latter to open slide gate below mixer by hand-operated chain drive. Bag operator now changes pilot-light signals and turns on the auger feed delivering either doughnut or sweet-dough mix to a Prater mill that fluffs it while continuously charging the electrically operated bagging machine. After bagger scales out 1,000 lb. (ten 100-lb. bags) from mixer, he again flips a switch to reverse pilot-light signals as an indication that he is ready for another batch prepared in the next mixer.

Mixer, horizontal auger feed, and mill are driven off 10, 5, and 7½-hp. motors, respectively.

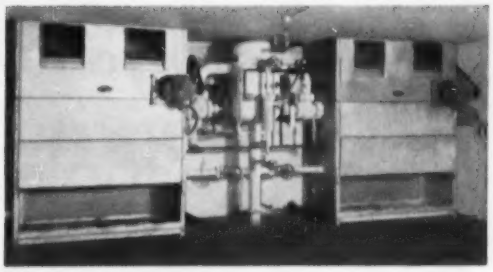
As a control measure, temperature in makeup and mixing departments is maintained at 80 F. by blower-type space heaters (12-in. fans). Sufficient dry ingredients for a day's run are also stored overnight in the makeup room.

Reason is to attain uniform blending of hot shortening with 80-deg.-F. dry ingredients. Otherwise, the shortening forms beads as it is mixed with the cold "drys," and is poorly distributed throughout the other ingredients during mixing.

End (*Resume reading on page 72*)

EXPERTS LIKE TO DO BUSINESS WITH EXPERTS

FOX DE LUXE FOODS CHOOSES CARRIER AMMONIA REFRIGERATION

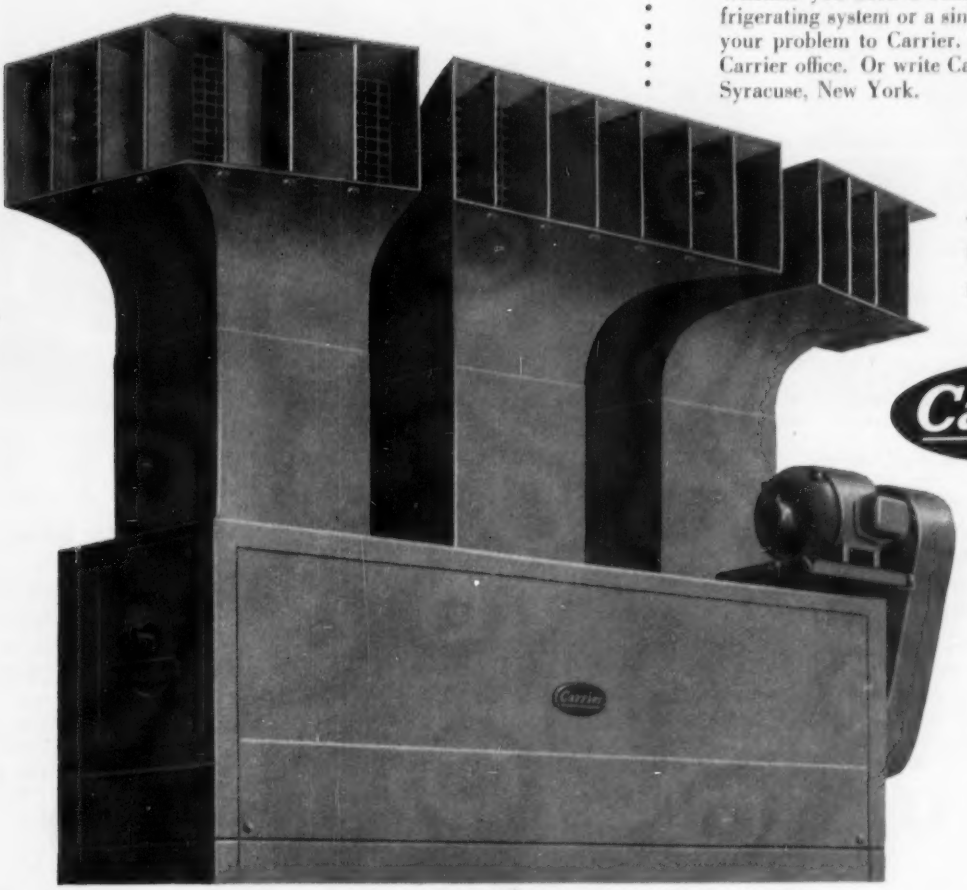


Experts in food processing at Fox de Luxe Foods, Inc., called on Carrier experts to triple the freezing capacity of their Watertown, S.D., plant. Carrier engineers designed a system that used the Fox plant's original equipment, added the Carrier Cold Diffusers shown above, and a Carrier Ammonia Booster Compressor with interstage cooling. Output was increased from 12,000 to 40,000 pounds of frozen foods a day—at minimum cost!

Carrier ammonia refrigerating equipment is at work in food processing plants, large and small, all over the world—serving companies like Dole Pineapple, Honolulu; Rath Packing Company, Waterloo, Ia.; United States Cold Storage Corporation, Omaha, Neb.

May we assist you?

Whether you need a complete ammonia refrigerating system or a single machine, bring your problem to Carrier. Call your nearest Carrier office. Or write Carrier Corporation, Syracuse, New York.



ammonia refrigerating systems

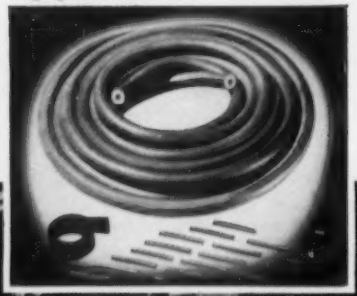
Carrier

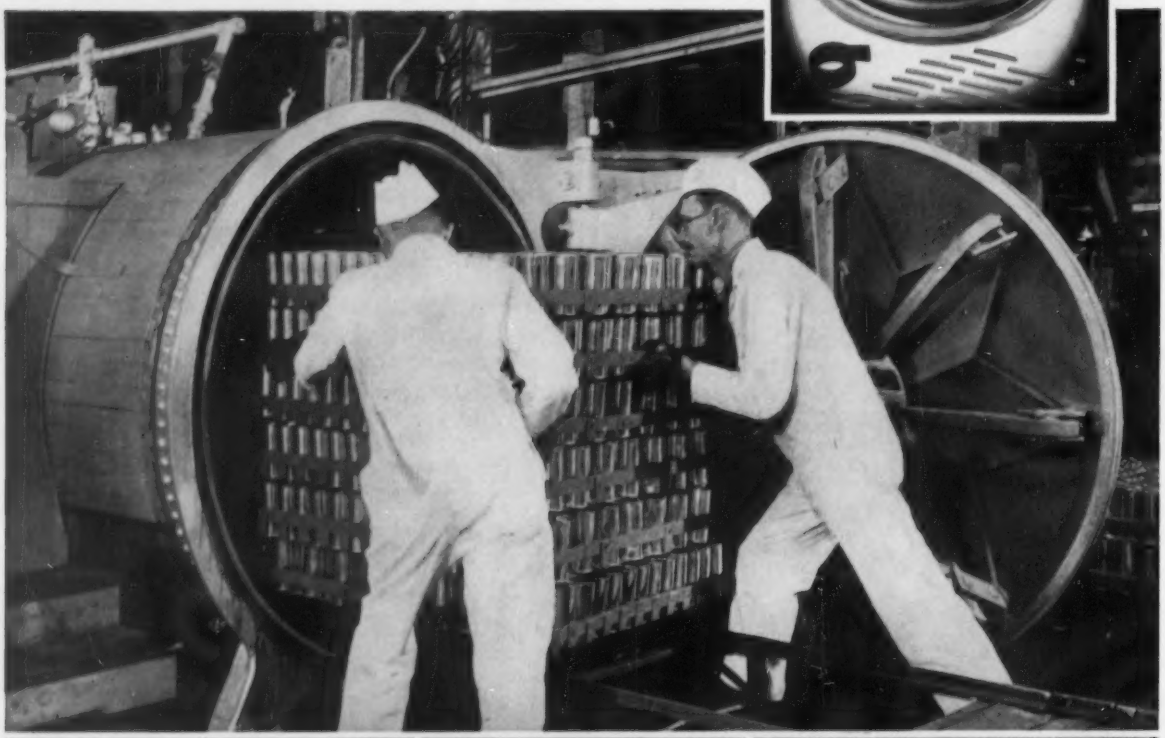
For more data, circle this page number on card at back →

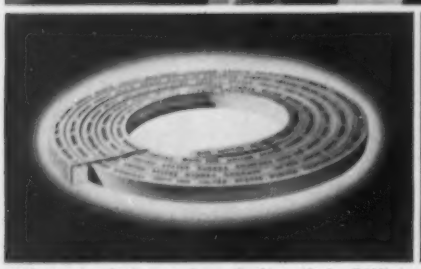
US RUBBER Cooker Door Gaskets

For Hot Cooking up to 350°

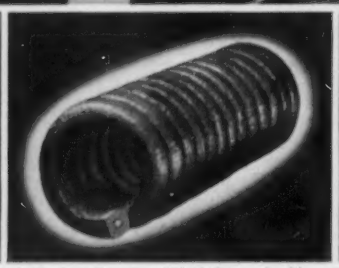
U. S. Eclipse® Red Tubular Gasketing (Style #803) is recommended especially for large exhaust heater doors and kettles where a large gasket is needed.



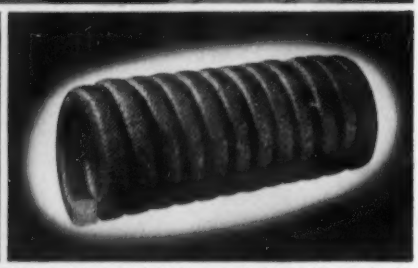




U. S. Peerless® Canvas Pump Packing (Style #463) is for use on inside packed pumps against hot or cold water, and for end rings in hydraulic sets. The method of manufacture reduces swelling to the minimum.



U. S. Low-Pressure Spiral Steam Packing (Style #381) is for use on rods and plungers against low and medium pressure steam and hot and cold water. Will not become hard in service. Lubricated and graphited.



U. S. Rainbesto® High-Pressure Rod and Plunger Packing (Style #101) handles high-pressure steam and air up to 500 degrees F. It has a non-hardening cushion, treated with heat-resistant lubricants and preservatives.

U. S. Cooker Door Gaskets are especially designed for the food-processing industry... ideal to use on retort doors for pressure cooking, even up to 350°F. Being chemically inert, they also are fine gaskets for vats and kettles when cooking or processing soups, spaghetti, vegetables, pre-cooked meats, vegetable shortenings, and detergents. In all, U. S. Cooker Door Gaskets provide the food industry with a maximum of cooking cycles, lowering costs by eliminating the need for frequent replacements.

Insist on U. S. Cooker Door Gaskets when replacing your present ones. There are 28 strategically-located "U. S." District Sales Offices to serve you or your supplier. Or write United States Rubber, Mechanical Goods Division, Rockefeller Center, New York 20, N. Y.

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Facts on New Bread Process Presented by Users

Also, helpful tips on capital investment, business-boosting products, coatings, and quality control are detailed by the bakery engineers

FE STAFF

Liquid-ferment baking got top billing at the recent annual meeting of the American Society of Bakery Engineers, held in Chicago.

Emphasized, too, were specific "hot issues" pertaining to purchase of new equipment, un-iced cake potentials, hard butter coatings, frozen cakes, and cake batter-temperature control.

Liquid Ferments

Continuous bread-making was called an economical must within the next few years. Speaker here was Paul Hodler, of Loblaw, Inc., Buffalo, who said that some modification of the brew method seems inescapably the cornerstone of this new concept of bread-making.

Brew bread, he cautioned, is different from sponge-dough bread. It must be treated as a new type of product and honestly evaluated on the basis of what it may do to halt the steady decline of bread consumption in this country. For, he said, what the bread baker gains through production efficiency, at cost of further decline in bread consumption, will certainly not prove helpful.

Brew Observations

A production of 40,000,000-plus pounds of bread by a 3,400-bags-of-flour-a-week liquid-brew installation, at the Chicago bakery of National Tea Co., was cited by Harold McGhee as bringing these significant observations:

▶ "Cheesey" off-flavored breads are not attributed to the method—be it liquid ferment or conventional sponge dough—but rather to poor sanitary practices.

▶ The liquid-ferment method slashed dough-mixing time from conventional 11-12 min. to 7-8 min. It also yielded better and consistently more uniform quality breads with 79-80 F. than higher temperature doughs.

▶ Equally good breads were made with or without milk in the ferment. But if there were less than 4% or no milk, then adding a buffer was necessary.

▶ When made with a 3,000-bacteria count extra-grade standard milk, a ferment can cause trouble when held after 12 hr. Milk with a 50,000-bacteria count (permissible in this grade) will give difficulties, even if it works satisfactorily in the conventional method.

▶ Brew process is not as critical to flour as the regular method. In fact, a much weaker flour, as well as one requiring less tolerance and mixing time, could be used.

▶ Light or heavy diastatic flour adjuncts have little if any effect on speed or gassing power of doughs. Final breads are softer when higher levels of amylase are used.

▶ Ferment does deteriorate some during storage. But if carefully handled, this is not noticeable after 24 hr. and presents no problem up to 48 hr. The ferment is "alive", and it should so be treated through gentle temperature changes.

Direct operating savings, he went on, paid for the liquid ferment installation in 10 months. Of the benefits attained, most important was termed the ingredient savings, with labor savings rating second.

As for the other leading benefits, there was an increase in the flour's moisture absorption*, and invisible losses were lower. The losses from machine breakdowns, or other work stoppage, were cut. Sales losses were reduced because of the flexibility of the brew method—shortening the period between latest possible adjustment of an order and actual mixing time for that order.

*Actually, this is the amount of liquid to assure a dough with proper handling and machining properties and produce the best baked product.

Shelf-life of these breads runs two days longer, in the opinion of Anton Bosch, Gilbert's Bakery, New Haven, Conn. He cautioned that temperature of the dough should be watched—to keep it between 85 and 88 F. and to make sure it doesn't fall below.

His concentrated brews were made by metering 900 lb. of water into a 200-gal. jacketed tank kept at 87 F. Then added, with constant agitation, were 30 lb. of yeast, 25 lb. of salt, 40 lb. of sugar, 6¼ lb. of malt, 4½ lb. of chemical brew buffering agent, and 20 enrichment tablets. Agitation was 4 hr. at 85 F., and it was not necessary to cool it.

While calling the advantages of the liquid ferment process significant, W. H. Ziemke, Fairfax Bread Co., San Francisco, declared that further research was still needed. He felt more work should be done on stabilizing ferments, working with concentrated brews with the idea of (1) lowering tank and refrigeration costs, (2) using materials like fungal protease at mixers to reduce mixing time, and (3) finding out more about yeast activity in long-held brews.

Buying New Machines

An easy guide relative to the money required for original investment in a business, and also for continued investment as the business grows into a "going concern," was detailed by R. G. Sutherin, Read Standard Corp., York, Pa.

He told how this plan included a 1-to-3 formula for initial investment and a 1-to-6 formula for net assets.

The first-named formula, he said, gives an investment figure approximately ½ of the total expected annual sales—with this suggested breakdown: Land, 5%; building, 50%; and equipment, 45%.

Then the 1-to-6 formula applies as

(*Turn to page 143*)

Author measures product samples automatically (left), counts bacteria colonies (right).

These Bacteria Checks

Prevent Beverage Spoilage

Standards are given and procedures detailed for complete sanitary surveys of equipment, ingredients, and finished product—with sanitizing steps included

NINO F. INSALATA

Associate Bacteriologist, General Foods Corp., Central Laboratories, Hoboken, N. J., formerly with White Rock Corp., Brooklyn, where he carried out work upon which following report is based

Basic in routing unwanted organisms from soft drinks are careful bacteriological surveys that directly inform management of the sanitary quality of its product in comparison with accepted standards.

First of these standards is the one established by the U. S. Public Health Service, as promulgated by the Federal Food & Drug Administration, S.R.A. 238 (Sanitary Quality of Waters). Date on this are given in Table I.

Second standard is the one a bottler should impose on himself relative to organisms, the presence of which result in spoilage regardless of whether or not the product is acceptable according to the USPHS Standards.

In Table II are listed organisms which should be looked for in the finished product as well as in the basic ingredients used in its manufacture.

Thermophils, which are heat-resistant in nature, may be capable of surviving batch and/or continuous pasteurization procedures which destroy mesophilic organisms. Therefore, their detection is important. Thermophils are often found in those materials which have been submitted to some form of heat treatment. Examples are: Liquid sugar, bag sugar in solution, and extract solutions.

Pathogenic staphylococci are capable of producing food poisoning and are to be considered as potentially dangerous to health as coliforms. While the former are not found as commonly as the latter, they are easily transmitted to a food or beverage by human contacts.

Bacteriological Procedures

Although molds and yeasts seldom present a health hazard they create a serious spoilage problem. These organisms attack sucrose, resulting in production of unfavorable organoleptic byproducts, such as acetic acid.

Both molds and yeasts produce excessive growth "mats," which obscure clarity of the beverage and form an unsightly flocculent precipitate. Yeasts, especially *Saccharomyces Cerevisiae*, are the greatest single cause of spoilage in beverages.

To determine presence of organisms listed in Table II, the following materials and test methods are recommended:

1. Materials:

a. Sterile 250 ml. glass sample collection jars (one per sample).

b. Sterile pipettes of 1.1 ml. delivery capacity.

c. Sterile standard size petri dishes (100x15 mm.).

d. Sterile neutralizing buffer solution (1.5% concentration and pH 6.8-7.2).

e. Sterile cotton swabs in a glass container for use with the neutralizing buffer solution.

Media for each specific test may be made as directed on the bottles. All materials may be sterilized by exposure to 15 psi. steam for 15 min.

Methods used for the bacteriological examination should be those recommended by the American Public Health Assn.[3] The finished product may be examined directly from the bottle.

Other samples of liquids, such as sugar solutions, extracts, concentrates, and water from the treating system, sand and carbon beds, filter or polisher, cooler, carbonator and filler,

may be collected in sterile, wide-mouth, 250 ml. jars.

Samples should be representative of normal operating conditions and collected in such a manner as to avoid over-exposure of the opened bottle. If not plated immediately they should be refrigerated, and if not plated within 4 hr. they should be discarded. Standard methods for fractional diluting, plating, and incubating are employed.

Collection and Plating

Inasmuch as yeast and molds in sugar (both the liquid and the bagged which has been put into solution) are known to be high vectors of contamination, it is important to test this ingredient for these organisms as well as for mesophilic bacteria. One method is offered by the American Bottlers of Carbonated Beverages.[8] The procedure follows:

1. Mesophilic Bacteria: Place 200g. of dry sugar in 205 ml. of sterile distilled water contained in a 500 ml. sterile flask. Dissolve completely and pipette 2.1 ml. of solution into each of two petri dishes. Add approximately 15 ml. of nutrient agar and mix homogeneously. Allow to solidify and incubate in an inverted position at 30 deg. C. for 48 hr. Colonies are counted on a Quebec counter. Combined count of colonies on both plates represents number of bacteria in approximately 2.5g. of sugar. Results should be recorded as such and all tests run in duplicate for greater accuracy.

2. Yeast and Mold: Pipette 2.1 ml. of above sugar solution into each of four petri dishes. Pour 15 ml. of mycophil agar or malt agar into each dish and mix thoroughly. If mycophil agar is used it should be adjusted to a pH of 4.0 with sterile 10% lactic acid. Plates are allowed to harden, then are inverted and incubated at 30 deg. C. for 5 days. Combined yeast cells and molds from the four plates are recorded as the number in approximately 5g. of sugar. Yeast cells and molds are counted and recorded separately.

Bacteriological examination of water, extracts, syrups, concentrates, salt solutions, and finished products may be made using the Standard Method, outlined in Table II. Syrup above 30 deg. Baume is difficult to pipette. Therefore it should be diluted with an equal volume of sterile distilled water. It is then necessary to double the dilution factor of the plated sample.

When plating simple syrups or finished syrups for molds and yeasts, the pH should be adjusted to 4.0-4.5 with a 10% sterile lactic acid solution. Results may be recorded as the number of organisms per ml. of syrup.

Bottles taken from discharge end of washer, and crowns from the hopper, should also be tested bacteriologically by standard plate count methods. Results are recorded as number of bacteria, molds, or yeast cells per unit.

General Plant Foci

Because of the nature of ingredients and of finished beverage, there are many foci which require examination in a bacteriological survey of a carbonated beverage plant.

I. **Bottling Equipment:**

A. Syruper:
1. Spy glass and washer
2. Weights and leathers
3. Chamber
4. Bell and valves

All apparatus should be completely dismantled and rinsed with clear, warm water, followed by warm water and a detergent, with brushing where indicated. All parts should be immersed in a 25 ppm. chlorine solution for 15 min. before reassembling. Then unit is flushed with 10 ppm. chlorine solution fed from the syrup room. Syrupers should be "milked" free of chlorine solution before use.

B. Filler:
1. Bells and stems
2. Valves and washers
3. Snifts

Same procedure followed here as outlined above. Wherever possible, the leather washers on the face of the valves should be replaced with plastic seated ones.

C. Crowner:
1. Crown hopper
2. Storage of crowns

Proper dry storage of crowns is essential. Crowns and uncleaned crown hoppers are the greatest source of mold contamination. Boxes should be dusted before opening and the crowner cleaned regularly.

D. Soaker:

1. Brushes: Black nylon bristles offer long life and least bacterial build-up.

2. Soaker solutions: Sodium hydroxide (2%) for 7 min. at 150 deg. F., or (3%) for 5 min. at 135 deg. F.

3. Rinse water: It should contain 2 ppm. chlorine.

4. Finished washed bottle: Test for aluminates and sodium hydroxide.

II. **Syrup Room Area:** This room should be separate from other operations. All doors and windows should be screened for protection against insects and dust. It should be equipped with a sink and have hot and cold running water. Proper pitch to the floor and sufficient drainage to sewers are essential. No raw materials should be stored here. The room should be properly ventilated with all incoming air filtered and purified.

A. General:
1. Walls
2. Ceilings
3. Floors

Particular emphasis should be placed here on completely water tight construction.

Tile or some other hard, non-porous washable materials recommended. Proper use of ultra-violet lights would

TABLE I—U. S. PUBLIC HEALTH SERVICE Bacteriological Standards for Beverage Manufacture

Test	Media	Incubation Time (Hr.)	Incubation Temperature (Deg. C.)	Permissible Organisms (Per.Ml.)
Standard plate count	Tryptone glucose extract agar	48	37	100
Coliforms	Lactose broth tubes	24	37	No positive reaction in more than one of 5 tubes run

TABLE II—THESE TESTS Provide Added Insurance Against Spoilage

Test	Media	Incubation Time	Incubation Temperature (Deg. C.)	USPHS Standards (Per Ml.)	Bottlers Standards (Per Ml.)
Standard plate count (*Mesophils*)	Tryptone glucose extract agar	48 hr.	37	100	100
Coliforms	Lactose tubes	24 hr.	37	1 of 5 tubes	1 of 5 tubes
Thermophils	Tryptone glucose extract agar	48 hr.	55	50	50
Pathogenic *Staphylococci*	Chapman-Stone	72 hr.	30	none	none
Molds	Malt agar	5 days	30	50	none
Yeasts	Malt agar	5 days	30	50	none

TABLE III—OPERATING STANDARDS for Bottle Washers

Tank Number	Temperature (Deg. F.)	Sodium Hydroxide Concentrations (Percent)		Time Intervals in Cleaning Tanks (Hr.)
		Applied Color Labels	Foil Labels	
1	110	4	5	80 hr.
2	160	3.5	4	60 hr.
3	140	1	1	40 hr.
4	110	fresh water	fresh water	24 hr.

help to hold down contaminations. If cement, or a cement-bound tile, is used for floor, an acid-resistant binder is needed, since constant contact of acid laden syrups decomposes cement and allows for seepage under the tiles. A rubber-base cement that is acid resistant is also serviceable.

B. Equipment:

1. Tanks for mixing and storage should be stainless steel, porcelain, or glass lined, and have properly fitting covers. Wood or other porous materials should never be used. Tanks and covers may be sanitized as described above for the syruper and filler parts.

2. Valves should be of stainless steel, detachable for easy sanitation, and tight fitting to prevent leaks.

3. Hoses. Canvas or cord hoses are objectionable because they become saturated with syrups and are a constant source of contamination. Tygon polyethylene hoses are seamless, nonporous, and easily sanitized.

4. Pasteurizer. Plate units should be frequently dismantled and sanitized as described above. Automatic temperature-recording charts and automatic alarms to warn of reduced temperatures are recommended safety devices.

5. Filters. Paper filters should be backed with nylon sheets to enforce greater filtration and keep paper fragments from the syrup in event of a break. Nylon sheets should be immersed in a 25 ppm. chlorine solution, along with the filter plates, to insure sanitary protection.

III. **Cold Room Equipment:** Many conditions in the syrup room also exist in the cold room and the same precautions should be taken. Careful storing of cartons and barrels of concentrates is necessary to avoid excessive moisture on these containers and thus reduce the possibilities of mold and yeast contamination.

Water Conditioning System

Regardless of whether a continuous flocculation system, a chlorine dioxide system, or a simple chlorine injection system is employed, all require close scrutinizing and a microbiological analysis of effluents.

Specifically, the units in the system should be treated as follows:

1. **Sand Bed:** Maintain a chlorine residual to and from this unit at all times to prevent bacterial and organic matter accumulations. It should be back-washed at least once a week.

2. **Carbon Bed** should be backwashed at the end of each production day with water containing at least 10 ppm. chlorine. When not used for two or more days, unit is back-washed with a 100 ppm. chlorine solution and sealed. When ready for use, it is forward washed until effluent reads zero on a chlorimeter scale.

Sterilization may also be accomplished by a 4-hr. exposure to 5-15 lb. steam pressure (200-250 deg. F.). Steam is introduced through the bottom, and should only be used in units that are lined with heat-resistant material.

3. **Water Polisher** comprises paper filter pads backed with nylon cloth. Sterilization may be accomplished by shutting the valve of the carbon bed and forcing chlorinated water from the sand bed into the filter.

4. **Cooler and Carbonator** may both be sterilized with chlorinated water from the sand bed which has by-passed the carbon bed. Cooler plates may be sanitized with a detergent solution before being washed down with chlorine.

Seldom thought of as a source of yeast contamination is the storage of returned bottles in which yeast cells have grown and propagated to the reproductive budding stage. Warm air currents created by heat of the bottle washer set the air in motion over these bottles and carry yeast cells throughout the plant.

Proper function of the soaker is essential to good sanitary conditions. Data in Table III govern its operation.

If metal foils are removed, it becomes necessary to determine the amount of sodium aluminates in the soaker compartments. Any tank containing over 2% aluminates (as determined by titration methods) must be dumped and recharged.

An additional preventive measure is the use of chlorine rinse (2 ppm., 45 lb. pressure) as bottles leave fresh water compartment of soaker. There have been some objections to this procedure, on the premise that chlorine produces off-tastes and oxidizes the colors of flavor beverages. However, there is more than a 13,000:1 ratio of product to residual chlorine in a 28 oz. bottle of finished beverage. Also, chlorine is readily dissipated in the presence of atmospheric oxygen, and bottles leaving the soaker are warm, which further aids in reducing the chlorine residual. Contact of organic matter in the coloring and flavoring material destroys the residual chlorine but not its benefits.

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Milk to Butter or Fat

—*Continued from page 52*

additional pieces. And these are the benefits attained:—

1. With 5,000 lb. an hour input, of 40% cream, 2,000 lb. of anhydrous fat an hour is produced.

2. Packed in 5-gal. cans, the product keeps 90 days at room temperature and over a year at 40. F.

3. Shipping costs are lowered because the product contains practically no water (less than 1 lb./ton) and requires no refrigerated trucks or cars. Users do not have to refrigerate it if it is used under 90 days.

4. To use, heating to 100 F. makes the product free flowing.

5. Process minimizes fat losses and, at the same time, protects fat-flavor esters.

Briefly, this is the method of making anhydrous fat at Rice Lake Creamery:

All steps—separating to 40%, concentrating to 80% butterfat, reversing fat phase, and serum removal—are the same as in the continuous buttermaking process.

The additional units needed are: (1) a centrifugal oil polisher, to remove the minute quantities of serum solids and the major portion of the moisture remaining, and (2) a small vacuum pan to aid in final moisture removal.

Coming from the serum separator, the 98%+ fat product goes directly to the oil polisher (a sanitary open-type separator) where non-salvable moisture and serum solids are removed to increase the fat content to 99.5%. Then the product is piped to a small balance tank for continuous delivery to the plate-type heat-exchanger, where the temperature is raised to 190 F. The fat is now drawn into the small vacuum pan, maintained at 29 in. or more Hg. Vacuum treatment raises the fat content to 99.8% or more.

A positive displacement pump removes the product from the vacuum pan and discharges it to a cooling section of the plate heat-exchanger for rapid cooling to 110-120 F. From here, it continues through a horizontal, ammonia-refrigerated chiller, then discharges into the dry fat container.

It is through these carefully engineered advances that Rice Lake Creamery is meeting today's challenging competitive conditions.

End *(Resume reading on page 53)*

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Containers

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You can save money . . . obtain a stronger, more useful container through our engineers' knowledge of aluminum alloys, tempers, gauges and die design. For these reasons, Ekco-Alcoa Containers has had the opportunity to create more special packages to fit specific needs than any other manufacturer. We have the largest line of stock containers . . . the only complete line of closure equipment, from hand operated to fully automatic. A minute's examination will show you that packages engineered by Ekco-Alcoa Containers give your product a better in-store appearance, greater strength at minimum cost, make filling, wrapping and packaging easier, and give the consumer the utmost in convenience.

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Remember—*Genetron* Refrigerants are super-dry! Their moisture content is exceptionally low; their overall purity extremely high. They meet the industry's most exacting refrigerant specifications . . . are freely interchangeable with comparable fluorinated hydrocarbon refrigerants produced by any other manufacturer. Follow the industry-wide trend to Super-Dry *Genetron* Refrigerants. Always ask for *Genetron!*

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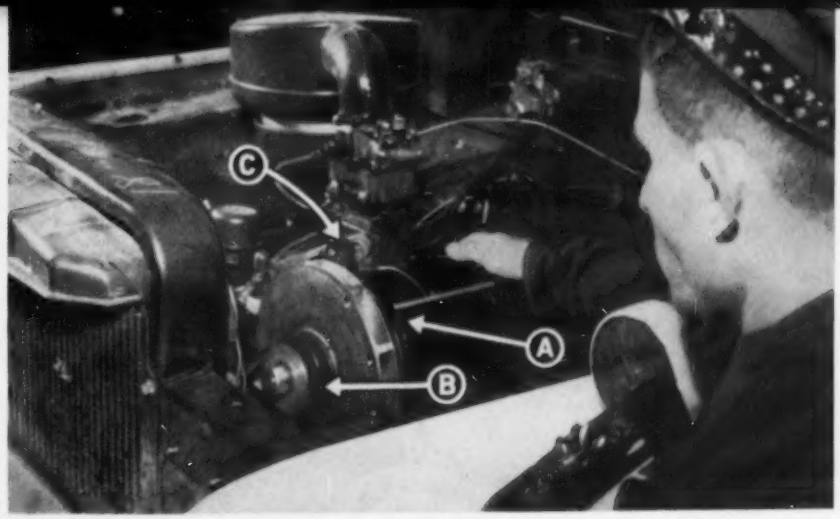


HEART of the truck-engine-powered unit is alternator (A). This is driven off the engine crankshaft by two belts (B), kept taut by adjusting bracket (C). Alternating current is converted to constant voltage DC by rectifier.

'Round-the-Clock Protection With

Electric Truck Refrigeration

Operating on current from engine-mounted alternator, new package unit maintains constant temperature at all speeds. It may be powered from 110 v. outlet when truck is parked overnight

Three Midwest companies have found a key to protection of truck-distributed food products in a new electric package refrigeration unit powered by a generator driven by the truck's engine. Bell Vernon Milk Co., Cleveland; Central Dairy, Bluffton, Ind.; and Detroit Packing Co. use the system, which gives top performance regardless of truck speed.

A plug-in attachment for any standard 115v. AC lighting circuit provides power when truck engine is not running, for round-the-clock refrigeration. This makes it unnecessary to unload cargo left-over from the day's deliveries.

The system provides refrigeration for trucks from ½- to 1½-ton sizes. Its electrical system consists of an alternator (or alternating-current generator), compressor-drive motor, evaporator-fan motor, voltage regulator, and selenium rectifier.

Parts are sold to a refrigeration manufacturer who builds them into the truck unit. He designs the system and selects refrigerant. Unit is then sold to user or a truck body builder who installs it in a truck.

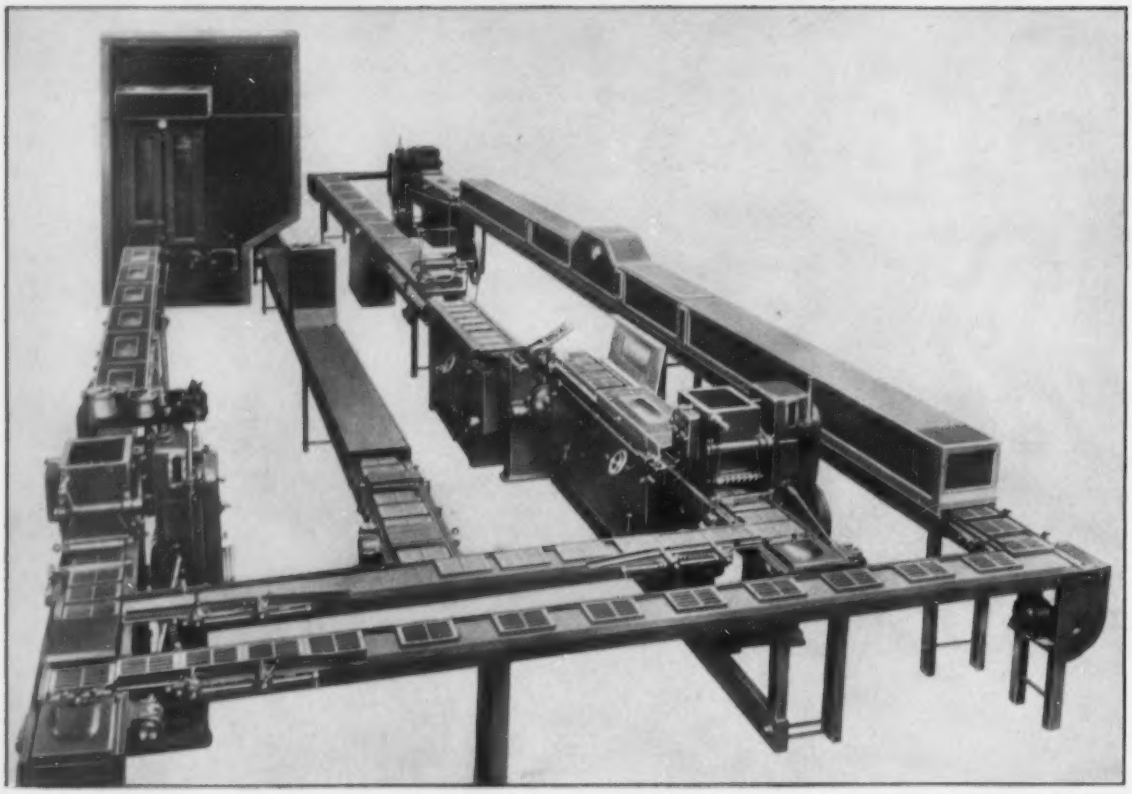
Since unit is thermostatically controlled, inside body temperature may be set for either fresh or frozen foods.

Heart of system is the alternator. Mounted on, and driven by, the

(*Turn to page 188*)

INSULATED BOX (right) in refrigerated compartment holds unit. Atop box is evaporator. Pictured during loading operation is truck operated by Belle Vernon Milk Co., Cleveland.

DURING STAND-BY, system operates on available 115-volt AC current. Plug-in (A) and regulator (B) are readily accessible from outside. Note louvered panel and door that permit air circulation.



This automatic 57 x 17-ft. candy line comprises 8 basic units—all "blueprinted" . . .

★Bars ★Tablets ★Filled Candies Made Non-Stop on—

Triple-Action Chocolate Line

Waste . . . labor . . . ingredient cost—all are cut with a double-circuit setup that spot-fills up to 36 mold-impressions at a time. Speed: 800-per-minute

HENRY S. BONDI
Chief Chemist, Frenchette Co., New York City

From Italy comes a radically different method for forming mold-type chocolate products.

Designated the Cavemil Crem Line by the manufacturer, Carle & Montanari, Milan, this latest setup combines eight basic machines, many of them brand new.

• Solid bars, tablets, and filled candies are all turned out on this flexible single-level line. And speeds up to 800 units per minute can be quite easily attained.

Furthermore, unique design of the automatic, continuous equipment permits use of low-cocoa-butter "couvertures", and cuts chocolate waste to a maximum of 0.2%.

Double-Circuit Operation

To achieve this flexibility, machines are arranged to form two circuits (see diagram). Pre-heated molds, which travel on chain conveyors, pass directly through a single spot-depositor for bar and tablet candy, or circle the entire line for making filled chocolates.

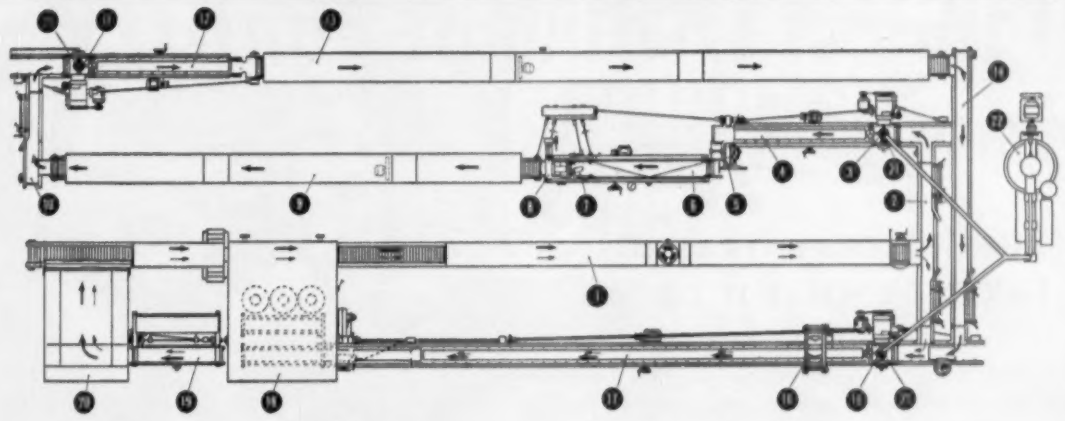
Four mold coordinators, located at strategic points in the conveying system, govern mold feed to operations.

Key unit in the new line is a piston depositor, designed to give extremely accurate spot filling and eliminate costly hand operations.

Chocolate is piped from a tempering machine to this unit, going through a vibrating screen, which strains out lumps. For close temperature control, depositor has a water-jacketed hopper. Here, chocolate is stirred by an agitator, specially shaped and speed-regulated to prevent mixing air with the product.

From the hopper, chocolate is forced into a depositor plate by 36 pistons—or less according to the type of mold.

Depositor plate measures 275 mm. wide (10.8 in.) and 24 mm. thick (0.9 in.). It can be made up to 175 mm.



1. Heating conveyor for empty molds (86°F.)
2. Mold coordinator
3. Shell depositing machine
4. Tapping machine
5. Turning-over machine
6. Tapping machine
7. Mold returning device
8. Scraping roller
9. Chocolate shell cooling tunnel (41-44°F.)
10. Mold coordinator
11. Cream depositing machine
12. Cream tapping machine
13. Cream cooling tunnel (44°F.)
14. Mold coordinator
15. Chocolate depositing machine
16. Blade scraping device
17. Tapping machine
18. Automatic continuous vertical cooler (41-43°F.)
19. Automatic demolding machine
20. Empty mold transverse conveyor
21. Vibratory strainers
22. Automatic continuous tempering machine

. . . in this diagram. Dark arrows: Filled-item flow. Light arrows: Tablets, bars.

long (6.9 in.). However, width and length of the molds and the depositor plate are always exactly the same.

Through the plate are drilled 36 holes, each of which is connected to a piston by a duct. This enables a precise amount of chocolate to be pumped to all 36 mold impressions with every stroke of the depositor.

Pistons are individually adjustable to give a range of 1-14g. (0.04 to 0.5 oz.). And the depositor can make from 20 to 26 strokes per minute.

Also, each piston can be turned on or off individually to suit molds of less than 36 impressions.

The same type of depositor is used in this line for pumping centers into the chocolate shells. And it will handle fillings containing nut chunks up to 4mm. in dia. (0.2 in.).

Continuous Line Operation

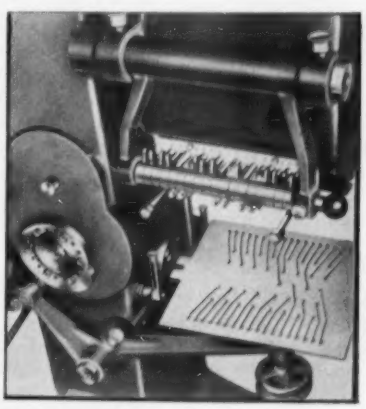
Before molds are filled, however, they pass through a heating tunnel. Then, for filled candies, they are routed to the shell, depositor, where a small charge of chocolate is introduced into the mold impressions.

Mold now advances to a tapping table, where it is vibrated both horizontally and vertically to eliminate air bubbles and even-out chocolate.

Next, mold is flipped over by a unique turning device, then again vibrated on a shell-tapping table. As excess chocolate flows from the mold, the combined shaking action imparts a smooth finish to the inside of the chocolate shells.

Thickness of the shells is regulated by adjusting intensity of the vibrators through variable speed controls.

A machine returns the mold to its normal upright position, and it then passes through a special roller-scraper that removes any tails left by the tapping tables.



CLOSEUP of depositor shows unique plate. Holes in this device match mold impressions. Ducts connect holes to pistons and insure identical product charge for each candy.

Vibrating and scraping units have tanks into which excess chocolate falls. This is pumped back to the tempering machine—not to the depositor. Thus, consistency of the chocolate in the depositor is not affected by adding to it hardened scraps of chocolate.

After passing through a cooling tunnel, molds carry chilled shells to a second piston-depositor that meters-in the filling mixture. And again molds are vibrated to settle filling, then pass to another cooler that chills the centers.

A final depositor adds more chocolate to form the candy bottoms.

Unique Mold Scraper

Key factor for waste control is a scraper located after the last depositor. Here, the mold halts momentarily while a series of three blades pass over its surface and remove all excess chocolate. The first two wipers are V-shaped, and move extra chocolate to the center of the mold. Final blade is straight, and carries surplus coating away without damaging chocolate centers—even on thin-bottomed candies.

A fixed blade removes chocolate

(*Turn to page* 170)

Ole Sage Episode

DOES FOREMAN TRAINING PAY BACK WHAT IT COSTS?

Grappling with this acute question, the Guff & Gripers find it can be mighty expensive to have instructed supervisors—but also mighty expensive not to have them

IVAN C. MILLER
Associate Editor, "Food Engineering"

The Guff & Gripe Club's next luncheon meeting found Batt Bulwark, works manager of Mull & Mull Co., very avid to get on with the foreman training talks. And he let loose the minute the main course was cleared:

"I'll go along with most of what was said at the last meeting on how this training racket . . . er . . . this training business developed. But nothing yet's been said to prove the training costs I've heard about are in order."

He drew out several sheets of notes. "I've been studying up—trying to find out something on trends." He squinted at his papers. "The U. of Minnesota, as reported by American Management Assn., finds an increase in the average cost of operating a personnel department—a jump from $48.59 per employee in '52 to $71.47 in '55.

"Out of that department cost, expense of training programs of all types went up from $4.56 to $5.28 per worker —little in itself, maybe. But just consider the away-from-the-job costs. If we could only measure it, think what the loss of production during training periods must run to!"

Several around the table tried to interrupt, but Batt plunged on: "Only a few years ago, training directors, *under any name*, were scarce as hen's teeth. But now we find there's an association—the American Society of Training Directors, which has some 2,500 members and holds annual conventions.

"And that's not all. Management groups and consulting organizations have seminars as well as other training. And colleges offer courses, both on the campus and in plants. Well, the costs, both direct and indirect, can run to many hundreds of dollars per man. And I don't doubt they sometimes hit a thousand or more.

Batt paused to light his stogie, whereupon Personnel Manager Milt Sorenson chuckled, "He's dropped the question right in your lap, Ole."

"I'll accept what Batt says on costs," spoke up Ole Sage. "In fact, maybe I'll go him one better. Right now, one company I know quite a bit about is considering 'investing' in a training 'experiment'—something that several of you may think is too costly.

"This outfit plans to use scientific selection methods to choose five of its workers for advancement to the foreman level. And on presumably competent advice it intends to provide these men with intensive training prior to their shouldering of the new responsibilities.

OLE'S RESPONSE to the sarcastic question was quick: "I prefer to have Batt himself do the justifying for me. He can. And I hope he will."

"Furthermore, follow-up instruction is planned for these men after they start on their new jobs. And all told, the cost of this whole training program will come to at least $3,000 per man."

Batt's disdain was evident. He leaned toward Ole and belittled: "Would you go along with anything so idiotic?"

Ole didn't waver. "This particular company has serious problems," he explained. "What's more, it is large and can afford the expenditures, which promise to solve their troubles. Therefore, as an experiment—and for the research knowledge that should be gained—I do consider the outlay justified.

In the subsequent babble around the table, Batt's voice came through: "I'm sure glad you aren't 'corn-hog feeding' my payroll.

Then Ed Strong, plant manager of Zenith, contributed. "I check in there with Batt," he said. "If I ever pushed for such expenditures at my company I'd be out of a job. How can you justify it, Ole—even," and he grinned sarcastically, "for the noble cause of research?"

Ole's response was quick: "I prefer to have Batt himself do the justifying for me. He can. And I hope he will."

An almost-explosive silence followed this startling statement by Ole. All eyes turned to Batt, who finally blurted, "What . . . what do you mean—*me* justify?"

Ole was cool as he replied: "I'd merely like to ask Batt a few questions—and it's just possible that his answers will actually justify what some of you men here seem to consider as unwarranted costs."

"Shoot," said Batt, who had now regained most of his composure. "A million questions and answers can't excuse such wasting of money."

The table was quiet in expectation as Ole fired his first query: "How many departments do you have in your plant, Batt?"

"That's easy," came the reply. "Just now we have 27.

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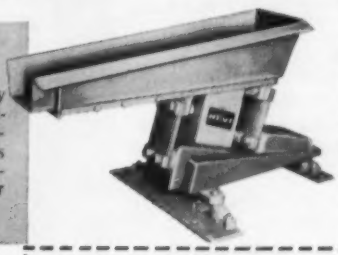

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But as most of you know we're starting an expansion, and there'll be some remodeling and modernizing as well. Lots of changes. And soon we'll have 34 departments."

"Same number of foremen as departments?" asked Ole.

"No," said Batt. "You see, we have 38 foremen now—because 11 departments require two foremen." Then he added, rather apologetically: "I'll admit there's a reason for me being concerned about foreman training. It's because we'll have to have quite a few more foremen. Some of the new larger departments may need three and even four."

Batt's eyes roamed around the table. He seemed to be looking for sympathy. Then he went on: "We've been watching for likely men to advance. But we've found very few we consider ready—in fact, hardly any that we can really depend on. If there's any training that'll make them satisfactory I'd sure like to know about it, even though I hate to have to pay the cost."

"Or pay the cost if you *don't* prepare them," chided Si Worth, personnel manager of Zenith.

"Now," broke in Ole, "let me get on with my questions: In your operation, Batt, what's the average number of employees per foreman?"

Batt permitted himself a grin. "You know only yesterday I was asked that same question by the front office. And I felt like a fool about it because the answer I had to give 'em was 21½. That ½ employee sure gets me."

When the laughter subsided, Ole resumed: "Is it because of modernization and advanced methods in your *competitors'* plants that your company is forced to make these improvements?"

Now Batt bristled again. "You can't call it force. No one can force us. Of course, over the years we have spent in the millions for plant improvement—to cut production costs or to improve product quality. Most of you know that three times in the last six years we've put out between $250,000 and $500,000 on new packaging lines."

"But we've never been *forced!*" And Batt pounded on the table to emphasize. "The savings we have made through the lowered production costs as a result of each one of the changeovers on the packaging line have more than justified total costs."

"Now we're getting somewhere," beamed Ole. "I'm certain everyone here will go along with any expenditure for plant or equipment that cuts production costs enough to improve the profit picture." Then Ole again turned to Batt: "If you could accomplish as much in reducing costs in your packaging department every six years in the future, as you have in the past six years, I'm sure you'd again spend the money for the equipment and I feel certain the company would back you up."

"You can bet on it," grinned Batt.

"So then," probed Ole, "would you feel justified in investing as much as $3,000 in research—call it pilot plant operations—or in any other means to make certain those investments in packaging machinery would pay off enough to justify them?"

Batt glared at Ole. "I don't like that question. It's like asking, 'Have you stopped beating your wife?' But here goes: Before any of those changes in our packaging-department equipment, investigations were made and pilot-plant runs were conducted. Yes, the cost of those tests prior to each replacement was more than $3,000."

Ed Strong took this opportunity to compliment Batt. "All of us know that any time you're responsible for your company's investment in plant or equipment the money is wisely spent."

"Now," said Ole, "let's do a little rapid cost figuring on just one department there at Mull & Mull. Generally, if a man hasn't reached the level of foreman by the time he's 35 either he doesn't want to be in management or lacks the qualifications. So usually when a worker is made into a foreman he's between 25 and 35. And if he stays through on the job he'll finally be retired, probably between 60 and 65. On the average, I'd say foremen supervise for about 30 years. Is that about right?"

Most nodded agreement, even Batt. Then Ole continued: "Now each M&M foreman is responsible for the hiring and firing of his crew of 21½ workers. Or at least he has a strong determining voice in the decisions. You see, I'm answering questions for you now, Batt—so if I'm wrong speak up."

"So far," mused Batt, "what you say is okay. But I don't see you're getting anywhere."

"That should become evident soon," promised Ole. "Anyhow, let's go on with Batt's average foreman. I hope you all agree that the expense of absenteeism and turnover and, for that matter, the number and seriousness of accidents, sustained by the average department's crew, will depend to a great extent on that average foreman.

"Then if you accept that you'll also agree, I believe, that over a wide range of output and quality variations, the foreman decidedly influences the production volume of his crew. And so we get to this point: Each of Batt's average foreman is responsible for the production that results from a labor expenditure alone of between $3 and $4 million."

At this, Batt was on his feet. "How can you say anything as crazy as that?" he demanded.

Now there were smiles on a few of the faces around the table as Ole carried on: "According to the Bureau of Labor Statistics, the average weekly payroll earning of food plant workers was $76.62 at the end of 1955. Fringes raised the cost to the employer to approximately $92 per week, which brings the present annual cost for the average food plant employee to just under $4,800. There are, of course, variations. The cost of the average brewery worker is more—about $115 a week, while the wholesale meat packer's average employee costs only slightly less than the brewery worker."

At this point Ed Strong cut in. "I know labor costs in food plants were up, but I had no idea they had reached that high level. Guess I forgot to count fringes."

"True," said Ole. They're going up almost every month, according to BLS. It was from that Bureau's report that I figured the average food plant worker's company-paid income went up $303 during '55. But now let's assume that the M&M food plant worker's wage cost stays put. Then during the average foreman's next 30 years of responsibility for the absenteeism, turnover, training, safety, quality, and volume of production of his men, the company's investment in each crew will be between $3 and $4 million.

"And mind you," said Ole, "that doesn't include wage and fringe increases, which almost certainly will have to be faced during the period."

"Whee!" whistled Ed Strong. "That's really staggering. And by the way, what if you included the income of the foreman?"

"Well," said Ole, "I do have something on food-plant foreman compensation, not included with worker cost. Going into the source of the information would take too much time for this session. But anyhow the figure comes to between $5,500 and $6,500 a year. And so, with the average close to $6,000, it would be a cost of $180,000 over the next 30-year period—that is, if no raises were granted the men.

"And now," went on Ole "we come to the $64,000 question: If Batt is justified in an investment of $3,000 to establish the wisdom of a $250,000 to $500,000 machinery purchase, then is that same amount too much to put into an experiment aiming to find a way to raise the production

(*Turn to page* 97)

New Retractable Mast Type Automatic TRANSVEYOR

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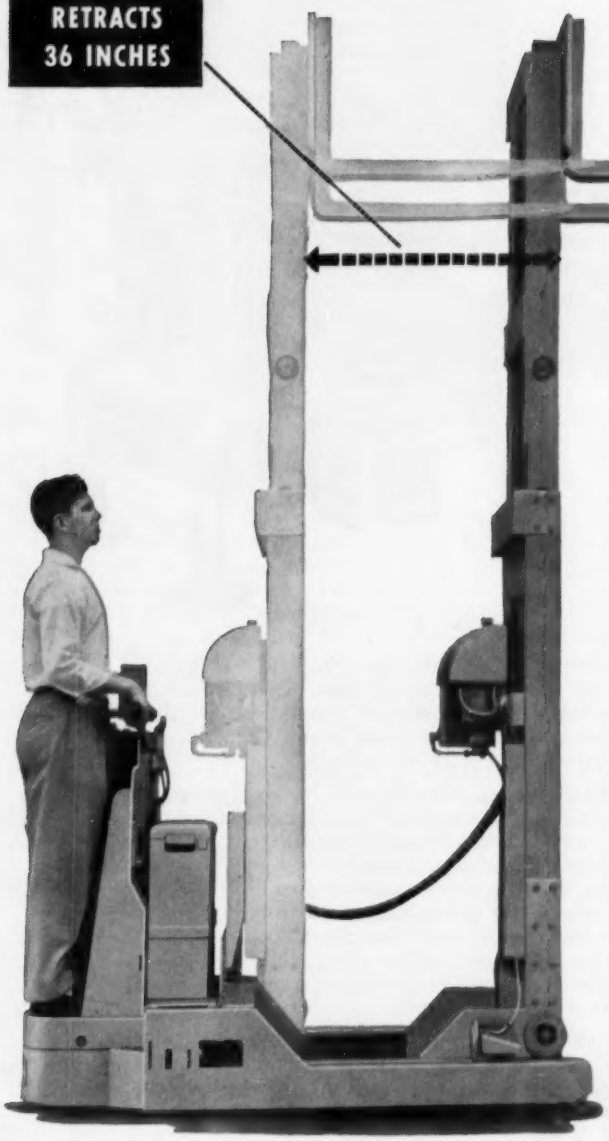

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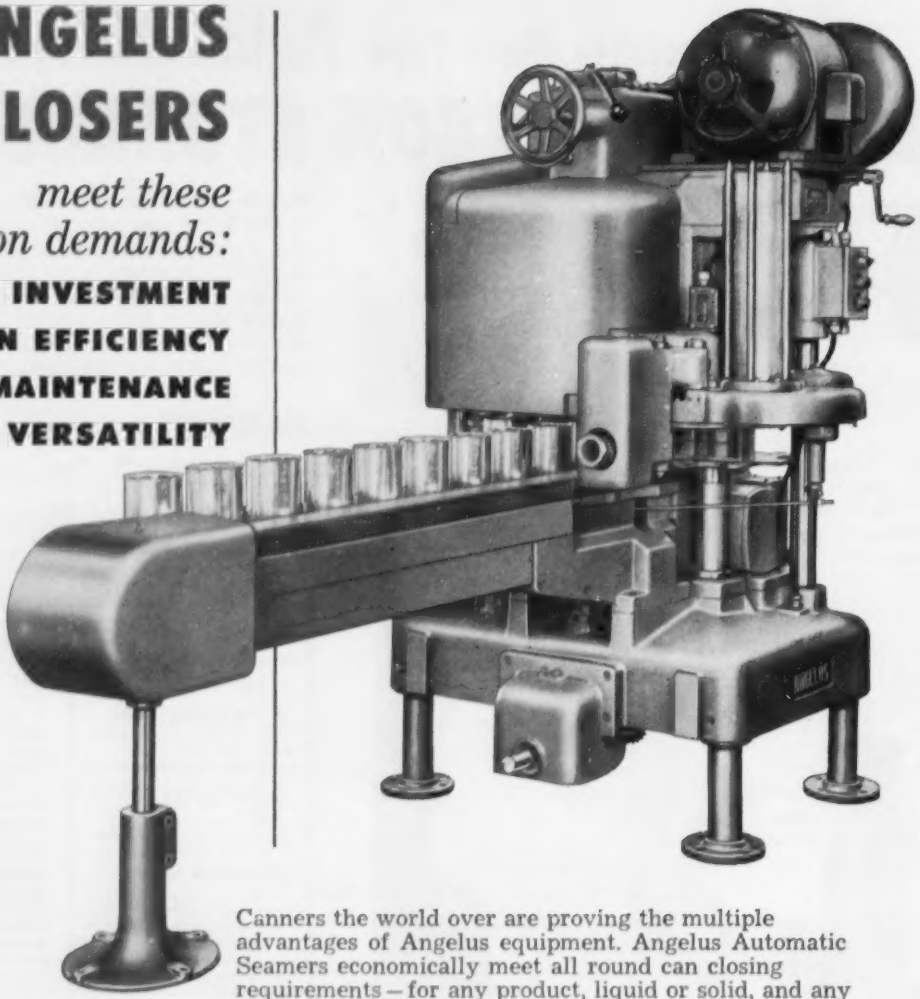

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volume resulting from a $3 to $4 million investment?"

Batt was deflated. "All I can say is that I had no idea . . . never thought to look at things just that way. Kind of upsetting. And I can see myself sitting up at night for quite a while to do some tall figuring."

He added: "Guess I've got to learn more about foreman training—what to provide in the way of instruction and how it should be given."

"Maybe at the next meeting," coaxed Ed Strong, "Ole will give us the low-down on *his* method. In any event, the matter of instruction looks like the next logical rung on our discussion ladder.

Readers are invited to contribute their comments on any points raised in our Ole Sage Episodes. Just address Editor, "Food Engineering," McGraw-Hill Pub. Co., 330 W. 42nd St., New York City 36.

From Ole's Notebook

How Workers View Jobs

Just what do employees think of their jobs and their companies?

To find out, Science Research Assoc., of Chicago, recently surveyed some 500,000 workers in more than 800 industrial organizations.

Of those questioned, 90% said their working hours were satisfactory. And more than 70% found pensions, insurance, and other fringe benefits to their liking. Moreover, the number who were proud of their organizations and of their own connections with them ran gratifyingly high—86%.

However, further queries brought out these contrasting revelations—

Only 36% indicated that they knew "where they stood" or "where they were going." And more than 50% said that if they could "do it all over again" they would take different jobs.

Meanwhile, some 60% questioned the efficiency of their own management, believing that their companies could be operated more effectively.

Also 66% felt that the compensation they received for their services was insufficient for comfortable living.

Vs. Plant Pilfering

Anti-theft programs in industry now put more accent on prevention of pilfering than upon apprehension and prosecution of offenders. This is borne out in a National Industrial Conference Board survey covering 100 firms.

Most of the reporting companies have aimed to discourage filching of company property while also protecting employees against loss of personal belongings.

Many companies admitted they didn't know the actual amount of their losses—one reason being that really tight control systems would cost more than the value of goods recovered.

All but a few firms declared they would, if need be, search plant lockers. On the other hand, only about half would venture to search workers' persons or homes (with prior written permission or warrant).

About half said they generally considered that dismissal of the offender was sufficient punishment. Resorting to prosecutions, it was pointed out, could result in bad publicity for the company. And unsuccessful prosecutions might lead to charges of false arrest and damage suits.

Some companies reported they had reduced filching of hand tools and small power tools—most commonly lost—by instituting systems for lending such items to workers for home use. Generally, these tools are charged out of the master crib for stated loan periods (often week-ends), with package-passes issued to cover their removal from the plant.

Nearly all companies stated they "checked" on outgoing parcels.

Management Is a Science

Some decades ago there may have been some slight excuse for failing to build "management in depth". For management in the early days of our free enterprise was purely an art.

But today management is much more complicated and technical. And while still an art it is also a science.

As a science, it can be taught to any who can read and write and who have the willingness to learn.—*Roy C. Ingersoll, Chairman of the Board and President, Borg-Warner Corp.*

Arbitrate? Or Risk Strike?

Often there's this question: Is it better to chance a strike rather than go to arbitration?

Though box scores may mean little, they are straws in the wind. Such a scoring of awards during one month is reported by American Arbitration Assn.'s Labor Tribunal—and it would seem to contradict the frequent opinion that arbitrators generally decide in favor of unions.

Number of cases checked totalled 129. Of these, 50 could be considered distinct victories for the union, while 65 were definitely triumphs for management.

Further, 14 were divided, and in 9 the workers were reinstated, but without back pay.

Even if all divided cases were credited as wins for the union, the score would still be 65 to 64 in favor of management.

Discipline was the issue in 42 of the cases. Companies were fully sustained in 21 and the unions in 7, while in 9 others company discipline was sustained in part.—*American Arbitration Assn.*

Human Factor Is the Hub

Where a company strives for effective human relations, the chief executive—the leader—should avail himself of staff assistance. He will use the best and newest information and techniques devised by management.

However, he cannot divorce himself from the overall function, regardless of how much he may delegate or assign. He will, if he is a smart executive, create the office of vice-president for human relations. And this will be a line job.

Further, he will specifically recognize that human relations form the center of the managerial wheel—the hub from which radiate finance, production, research, and all the other important spokes.—*Frederick J. Bell, Executive Vice-President, National Automobile Dealers Assn., before California Personnel Management Assn.*

Most Vital Is Interest

In developing management personnel, the tools are not as important as sincere interest.

Executive development must include a good program of executive apprenticeship. And the overall program must be long-ranged and include sound personnel planning and training.—*T. W. Pryor, Director of Training, Goodyear Tire & Rubber Co.*

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Bin-Shipping Liquids

—Continued from page 49

Too, the user must have holding tanks for each variety of chocolate coating employed in his production. Helpful in meeting variety demands are the new split-tank trucks divided into two 15,000-lb.-capacity compartments.

Bins, too, introduce particular conditions, as compared with the tank-truck method. Transport costs are higher, since bins must be returned empty. And customers must handle them in and out of the plant with fork-lift truck.

In short, the user who seeks the new bulk-shipment advantages may readily check the points of each of these two methods—tank truck and bins—and so decide which one best fits his own operation.

End (Resume reading on page 50)

Electronic Color Sorters

—Continued from page 48

of the sorters, which are installed in parallel. Floor of each tray is composed of boards turned on edge. These move up and down in relation to each other, thus keeping the lemons moving toward the far end. Each board is located at right angles to direction of flow of lemons, and has seven notches cut in its upper edge. At the inlet end, the notches are quite shallow, but they become progressively deeper toward the discharge end.

The fruit tend to separate into ranks (7 abreast). Near the discharge end, "interference pegs" protrude from between notches in the boards and topple any lemons that are riding on the ridges.

At the discharge end, a swinging gate opens at set intervals and allows the lemons (7 at a time) to drop into a continuous, pocketed conveyor. Opening of gate is synchronized with conveyor travel so that each pocket receives one lemon.

Pockets travel horizontally until they reach a point directly above the viewing chamber. Here, they round a small sprocket, mesh with a mating conveyor having sections that act as lids for the pockets, and travel vertically toward the viewing chamber.

This vertical travel is designed to arrest any vibration or rotation of the lemons. A few inches above the viewing chamber the conveyors separate and allow the lemon to drop through its aperture, and into the rubber-lined pockets of the delivery wheel.

End (Resume reading on page 49)

Letters to the Editor

Educator Proposes New Approach To Training of Food Engineers

Dear Sir:

The pressing need for a re-evaluation of current food technology education was very convincingly pointed out by Dr. Livingston, of the University of Massachusetts, in a recent Letter to the Editor (FE Nov. '55, p. 206).

Dr. Livingston suggested that greater emphasis be placed on basic sciences in our curricula. He also stressed the desirability for clearly and realistically distinguishing between "food science" and "food engineering."

The "food scientist," with a thorough background in all the basic supporting sciences, would be concerned primarily with research and developments related to food materials as such.

The "food engineer" would be concerned with the reduction to commercial practice of the developments of the food scientists, drawing on a thorough training in the basic engineering sciences.

It seems that the adoption of these concepts by industry and educators alike would be a very positive step toward assuring adequate and proper training of future personnel for the food field.

The reorientation of existing food technology curricula to train food scientists can probably be undertaken with little difficulty. A much greater problem presents itself, however, in the establishing of food engineering curricula. And there are two principal factors which must be taken into account in this connection.

The first of these is the increasing trend in engineering education to lean heavily on basic engineering sciences, leaving little or no time for additional specialization at the undergraduate level.

Secondly, it must be recognized that a food engineer, in addition to a sound engineering background, needs more than a superficial knowledge of the properties and nature of foods and food constituents. A rather basic understanding and appreciation of chemistry, biochemistry, and bacteriology is required as well. In this writer's opinion it is doubtful that all this training can be adequately obtained in a four-year course.

A closer look at the functions of a food engineer will reveal that he is essentially a process engineer. He deals with the development, design, operation, and control of food processes. In this sense, food engineering is closely akin to chemical engineering; in fact, the latter is often referred to as "process engineering."

This may indicate another approach to the training of food engineers—an approach which so far has received insufficient attention. That is the possibility of instituting graduate-level food engineering options in those universities now offering food technology programs.

Such options should be open only to engineering graduates, preferably to graduates with process or chemical engineering background. And the option should lead to an advanced degree in food process engineering in one to one and one-half years. Many of the necessary courses in food technology and supporting sciences will already be available in these schools. But the key courses in this program should be food process engineering at an advanced level, commensurate with the process engineering background of the students.

The outlined program would assure well-rounded graduates, with a thorough training in both engineering and food processing. These men should be much in demand.

Well-defined food engineering options at the graduate level, specifically based upon undergraduate work in engineering, would also have considerably more appeal to engineering graduates than have the present graduate food technology programs. More engineers might therefore be induced to enter the food field.—*Oddvar Solstad, Assistant Professor, Chemical Engineering Department, University of Massachusetts, Amherst.*

COMMENT — This proposal has much merit and deserves careful evaluation. However, on our editorial page we propose 4-year courses, in both science and engineering, because a graduate trained to think right, and equipped with proper basic knowledge, will continue to learn while successfully handling beginner's work. That's the way it is in other fields of engineering.

Merits of Prof. Solstad's proposal must be weighed against the certainty that the extra time and expense involved would reduce the number of food engineering students.—The Editor.

In Behalf of Progress . . .

Technical Food Training Must Be Crystallized

Educators and food technologists have been pondering the problem of an accredited course for schools training technical men for our industry.

But many questions have to be resolved. In the first place, there is no one, widely accepted definition of a "food technologist," nor of a "food engineer." So it is difficult to say exactly what training courses are required. Then there are differences among educators in the philosophy of such education. Should it involve more basic science and less specific practical knowledge, for example. And funds, facilities, personnel, and policies vary on different campuses.

There is a trend in the thinking toward an accredited course, and more imminently a "core" curriculum. This is good, and it is to be hoped that it does not move too slowly.

The situation is urgent. It is imperative that more technical men be trained for the food industry. But it will take accredited courses, leading to recognized professional degrees, to interest high school graduates.

Establishing the proper courses requires the cooperation of food firms who hire technical people. They should give much more thought to the kinds of technical talent that will help them most in the future, and they should make their needs known. After all, technical training must be shaped to the purpose it will have to serve.

Training in food science is needed, particularly for research. And food engineering is required to handle the increasingly complex food processing operations.

Contrary to the views of some educators, we favor a four-year undergraduate course in science, and another in engineering, with the first two years essentially the same.

In any event, industry and educators should work together to establish courses leading to recognized professional degrees.

Sure, there are problems. But the job can be done. And bigger problems are being created by its being undone.

Don't Pass Up Chance of Half a Century

"A law carefully framed is greatly needed in this country, where adulteration and substitution are every day practiced."

Now don't be alarmed. That frightening statement was made in 1879—by Dr. Peter Collier, of the Department of Agriculture.

It doesn't apply now, of course. But it might if we had not for 50 years had effective federal pure food laws, a capable and fair-minded Food & Drug Administration, and public-spirited operation between manufacturers and administrators.

We cite Dr. Collier's statement to shake the complacent attitude that comes from taking for granted our present happy situation. For there is no certain guarantee that the almost absolute safety and high nutritive value of commercially processed foods will always prevail in the years ahead. Certainly new problems have arisen.

So to maintain the outstanding record of our industry, not only must legislation and regulations be kept abreast of the times, but FDA must be backed up by adequate funds and industry cooperation.

To achieve these ends, people must be made aware of the job that has been done in the past so as to appreciate its significance.

The opportunity to do this is at hand. It is the 50th anniversary of the federal food, drug and cosmetic laws, June 30.

At considerable expense, the Association of Food & Drug Officials of the United States has put together the history of the 50 years. It has developed a seal that can be used in advertising and on display cards, packages, and stationery. And it has designed a postage meter slug which flags the half century of progress.

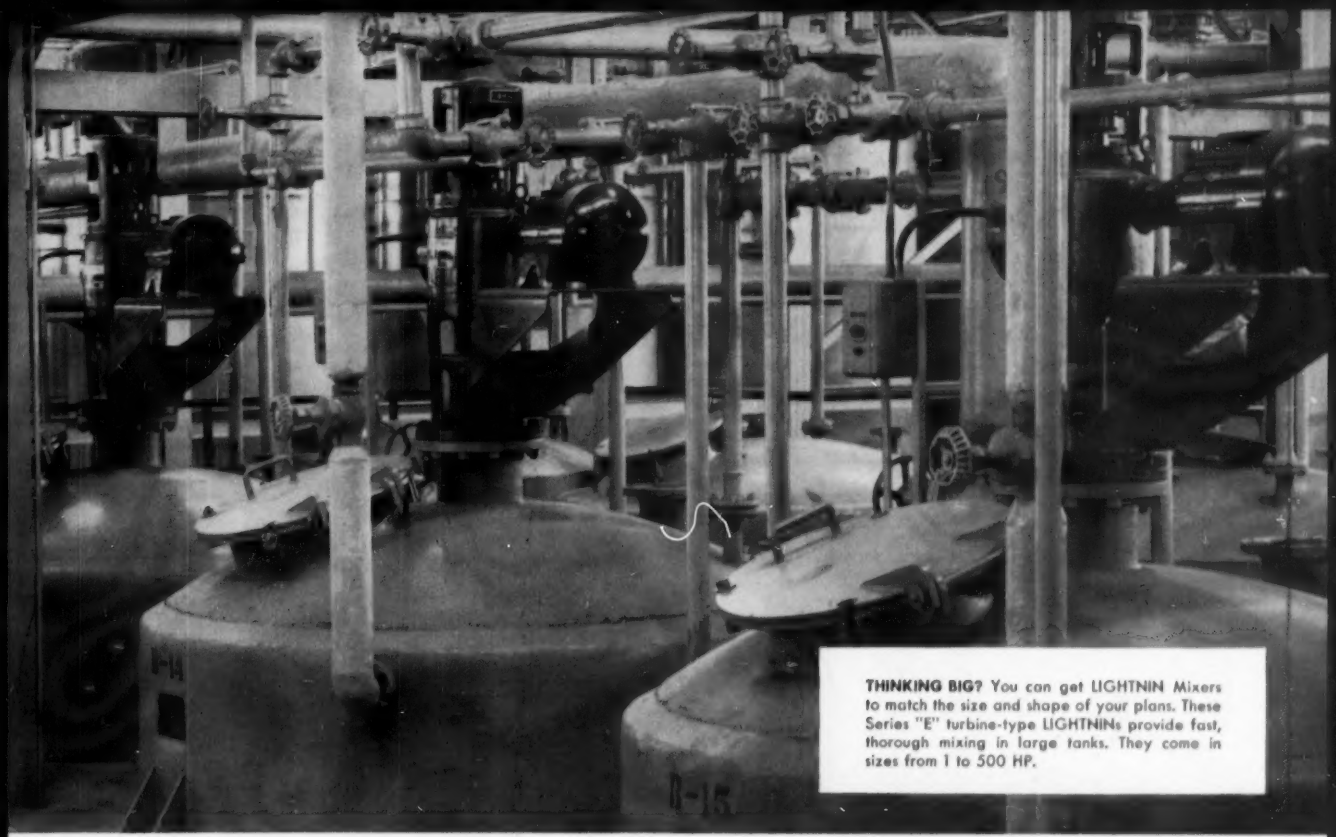
Your company would be well advised to make wide use of these materials, or something similar of its own creation. What better way to tell the public that processed foods are pure, nutritious, and safe—and convince by implication that your products meet these requirements? And you could nicely go a step further and tell how you so carefully control quality and purity.

Your firm will benefit not only directly, but indirectly. For one thing, publicizing technical achievement will interest more young people in becoming food scientists or engineers.

And while helping yourself and your industry, you will render a public service.

Food companies will miss a golden opportunity if they don't publicize the golden anniversary of achievement in quality control. And June 30 is not far away.

P.S.—FDA would do well to celebrate this anniversary by backing the enactment of new food legislation acceptable to the industry. Such legislation would be effective, yet practicable.



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"Will it keep my mixing costs in line *for the next 10 or 20 years? How?*"

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You get the mixing results you want, without paying for unwanted horsepower. The *one* correct mixing pattern for your process is assured, through scientific mixer selection and scale-up based on thousands of pilot runs.

And you save on installation, because LIGHTNINs arrive fully assembled, factory-aligned, ready to mount and run, without extra construction.

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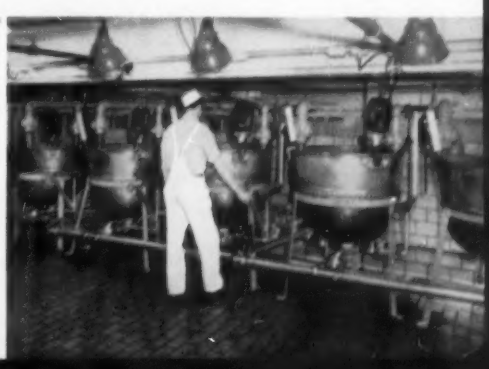
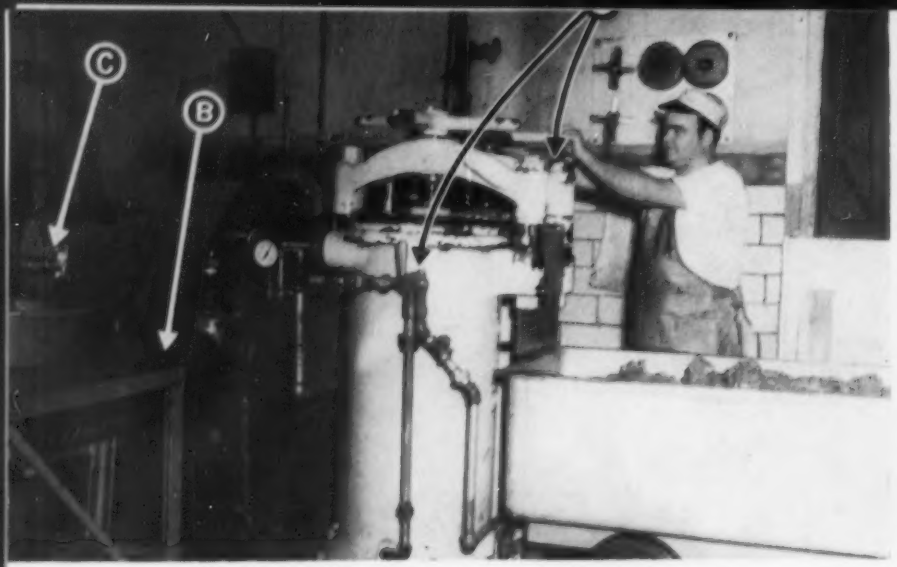




UNFOLD HERE

FROM tandem stuffers (A), meat is forced (90 psi. pressure) into worm-screw feed (B), then extruded and cut into balls by 2-bladed rotary knife (C).

Ready-to-Eat Specialties

Midwest food company packs 9 different ones on 2 processing lines. Continuous, straight-line operations boost efficiency and quality

STRAIGHT-THROUGH production on separate processing lines has enabled Otoe Food Products Co., Nebraska City, Neb., to attain highest efficiency in making "ready-to-eat" specialties.

Packed under the Morton House label are five different type products—casseroles, pot pies, meat-sauce sandwich fillings, 16-oz specialties, and cakes and puddings. Processing of the first three was illustrated in our March FE foldout. And now the making of the latter two is detailed in the accompanying flowsheet.*

Prepared on the 16-oz. specialties line are spaghetti and meat balls with tomato sauce, brown gravy with sliced beef or pork, ham gravy and sliced ham, mushroom gravy and Salisbury steak.

In production of spaghetti and meat balls, former is charged into perforated stainless baskets and steam-blanched in large kettles–Point (1) on our flowsheet.

On a company-engineered line, sausage stuffers discharge ground beef to a meat ball forming machine (2). Here, a screw breaks up air pockets as the meat continues through short vertical and horizontal extrusion pipes. Meat is then cut into balls by a 2-bladed rotary knife. Continuous operation is attained through use of two stuffers hooked in tandem.

Tomato sauce is prepared in two 150-gal. agitator-equipped, steam-heated tanks.

The blanched spaghetti is drained free of water, then dumped onto table of 20-pocket, hand-pack filler. Approximately 5¼ oz. are placed in each can (3), which then discharges to a conveyor where it is check-weighed. Further along the conveyor, four meat balls are added, then can enters 12-head rotary filler that adds the sauce (4).

Cans are vacuum-sealed (65/min.), heat-processed, cooled, labeled, and case-packed for shipment.

Prepared on the second line are such baked products as fruit and pound cakes, and the plum and date puddings.

In making fruit cakes, glazed fruits, raisins, sugar, flour, melted shortening, and seasonings are weighed out and mixed with fresh whole eggs in beater-type units (6). When thoroughly mixed, bowl is raised by an electric hoist and its contents transferred to hopper of a 10-pocket volumetric filler (7).

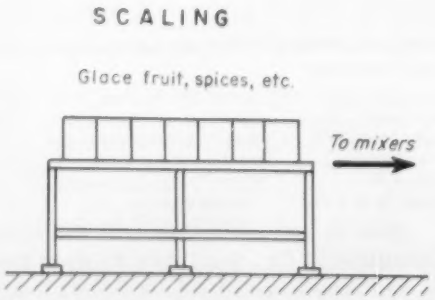
Cans are lined with fluted parchment paper and fed to filler where they receive 5¼ oz. of batter. Then they go to a 4-spindle clincher that applies the lids.

Next they are conveyed to a gas-fired, thermostatically-controlled traveling tray oven (8). Here, the cans are assembled in lots of 24, then a pusher bar loads them onto the trays of the oven.

One hour later they are discharged, vacuum-sealed, and transferred to an 80-ft. conveyor-cooler equipped with cold water sprays. Following cooling, cans move to a flip tester, where they are checked for vacuum. They are then labeled and cased.

* For the story behind all five of Otoe's versatile operations, see "Builds Business by Specializing in Specialties," FE Mar., p. 50.

CANNED CAKES AND PUDDINGS



FOOD ENGINEERING
April 1956 Pages 102-105

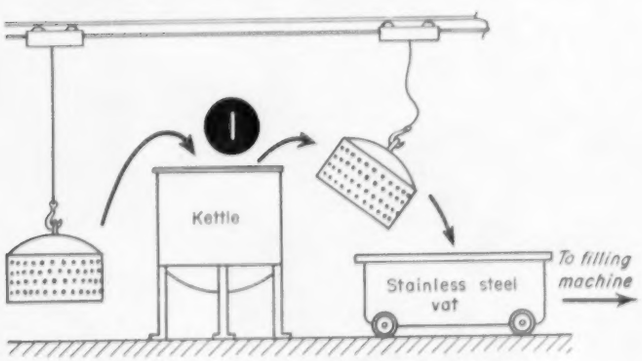
3 **BLANCHED SPAGHETTI** is hand-packed in cans on 20-pocket filler. Then cans are checkweighed (background).

4 **MEAT BALLS** are placed in cans containing spaghetti, then 12-head filler adds sauce.

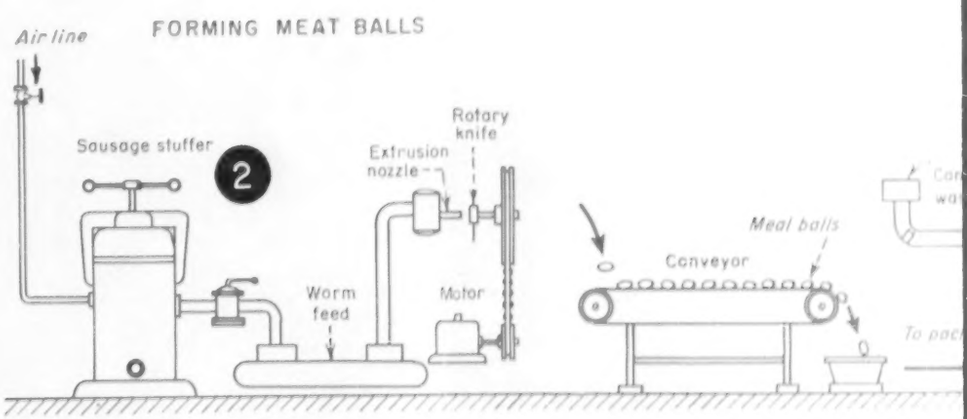
6 **AT SCALING TABLE** (left) glace fruits are dients are weighed out in center section. The

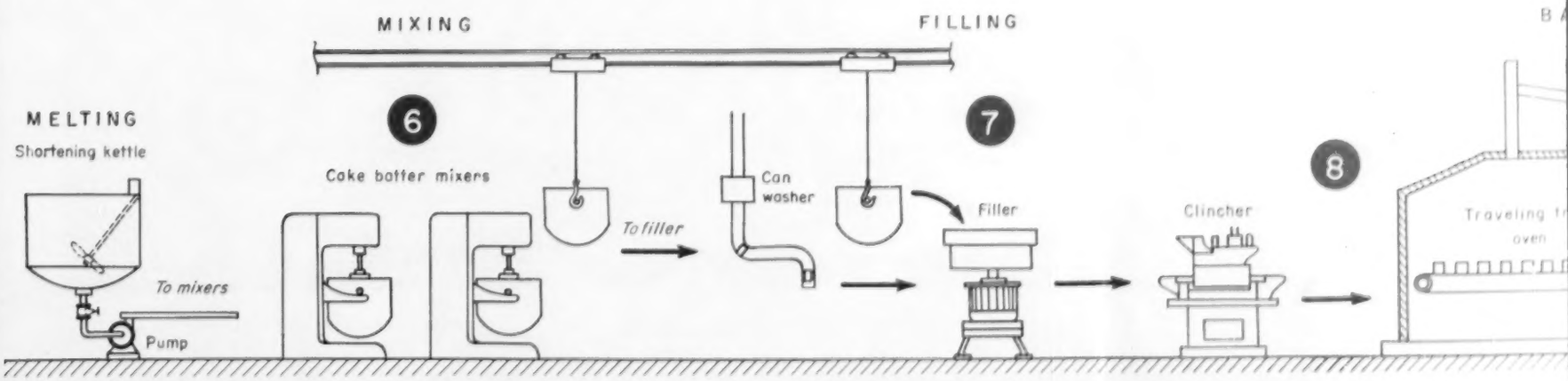
16-OZ. SPECIALTIES

BLANCHING SPAGHETTI



FORMING MEAT BALLS





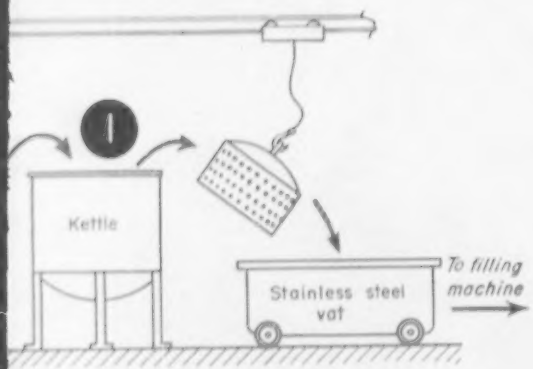
HED SPAGHETTI is hand-packed in cans on 20-pocket filler. ns are checkweighed (background).

4 MEAT BALLS are placed in cans containing spa ghetti, then 12-head filler adds sauce.

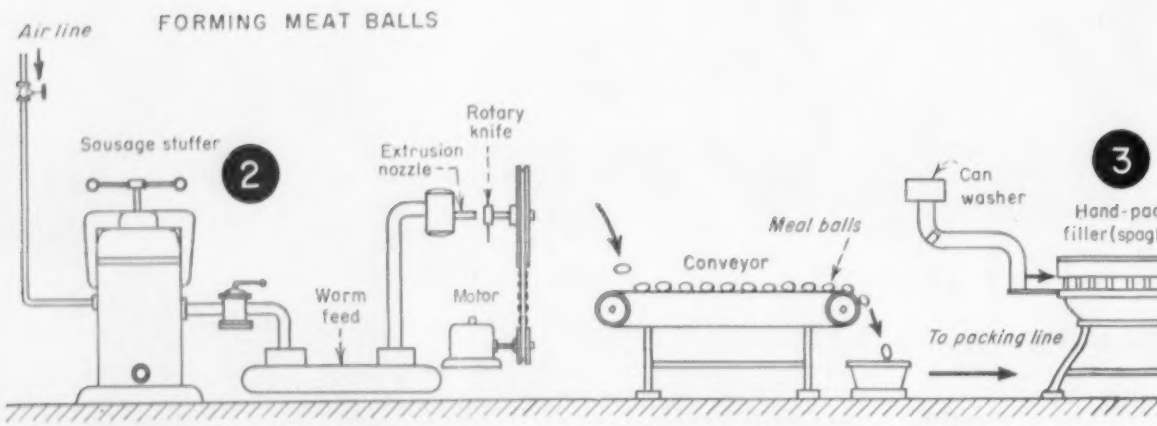
6 AT SCALING TABLE (left) glace fruits are prepared, and sho dients are weighed out in center section. Then all products are

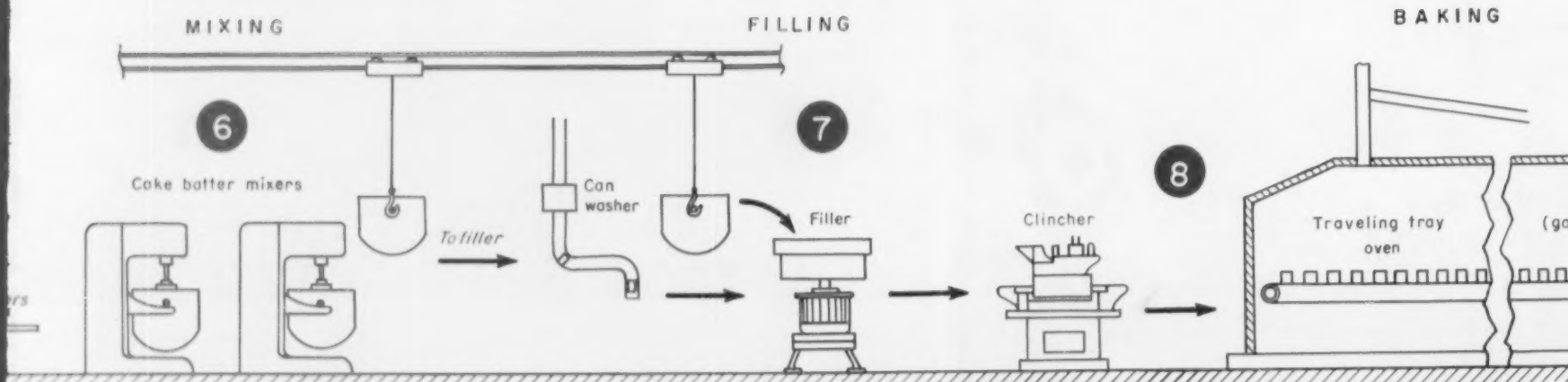
OZ. SPECIALTIES

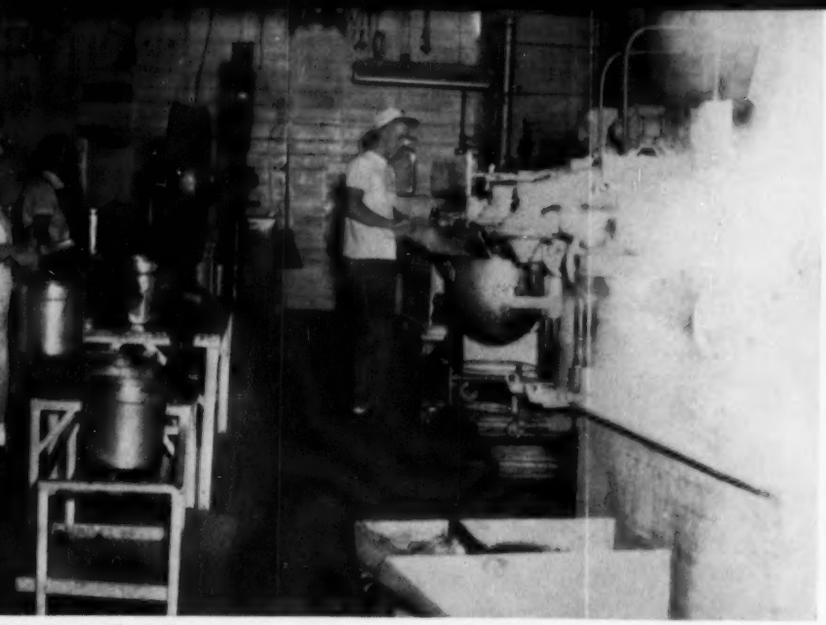
LANCHING SPAGHETTI



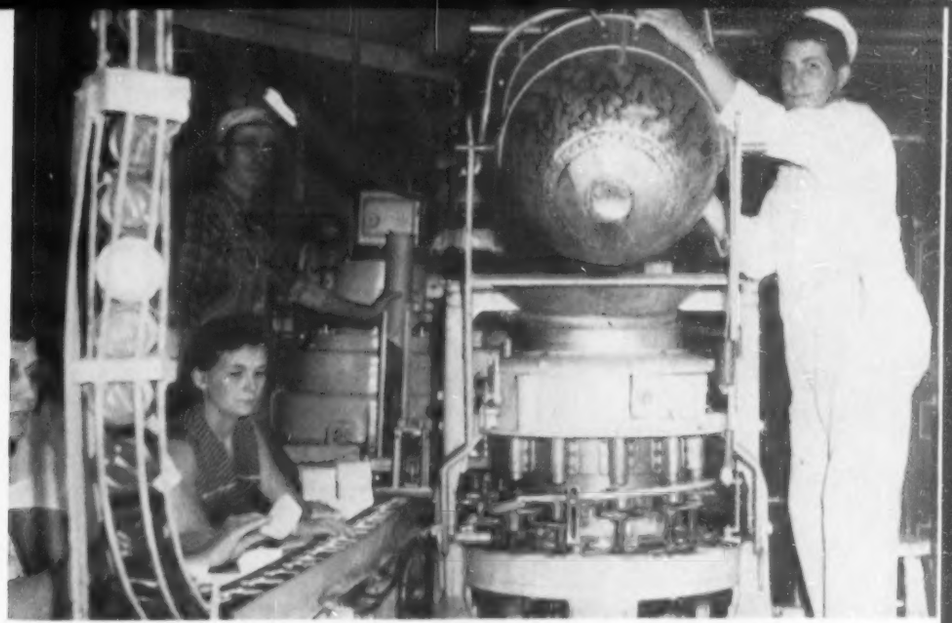
FORMING MEAT BALLS



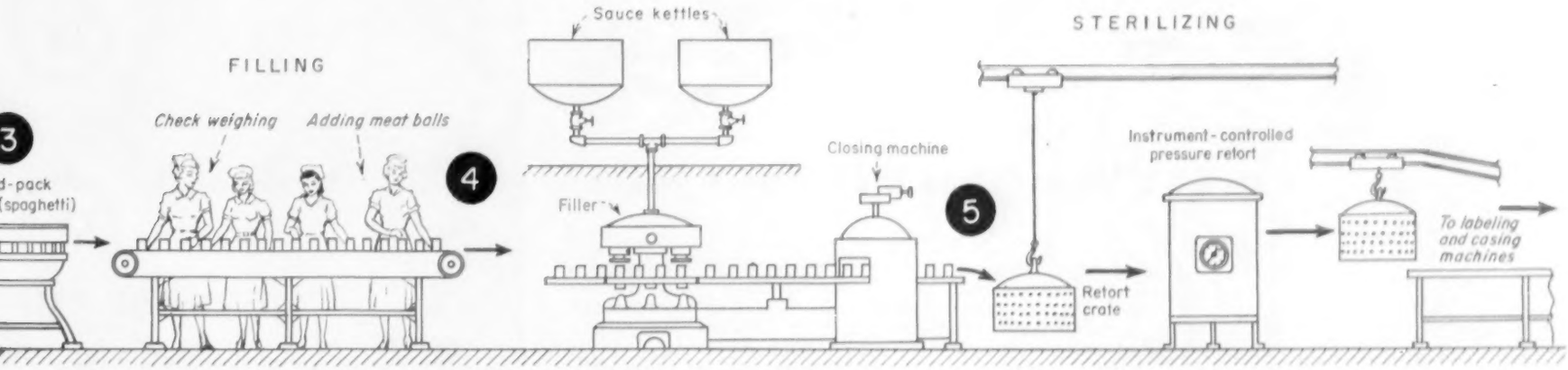




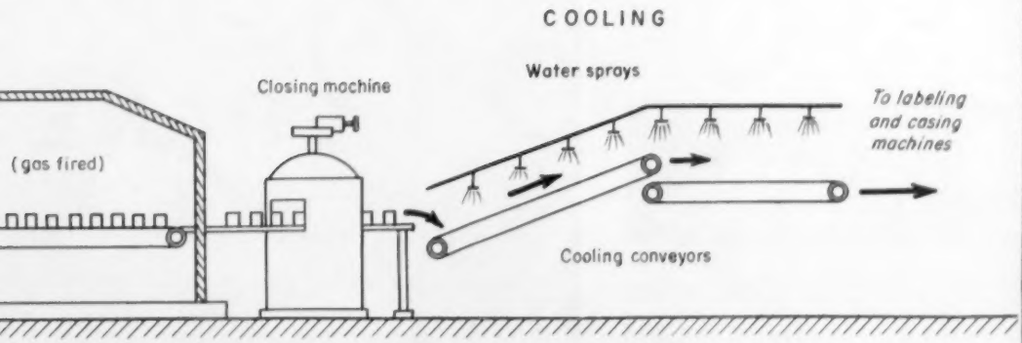
l shortening is melted in kettle directly behind. Spices, fresh whole eggs, and other ingre-s are combined in beater-type mixers (right).



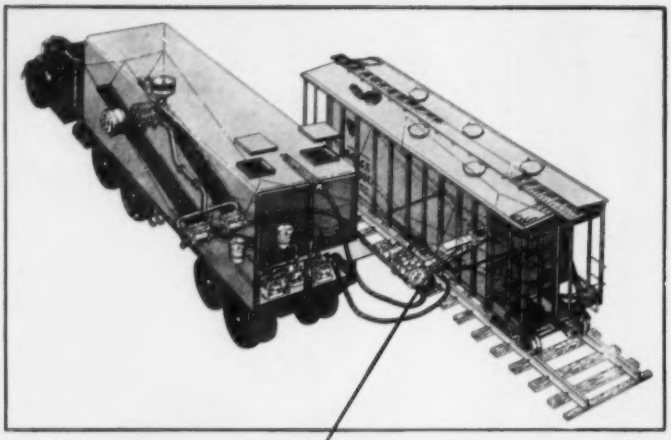
7 MIXER BOWL is moved to 10-pocket volumetric filler an dthe cake batter transferred to its hopper. Women (left) place fluted parchment cuts in cans prior to filling.



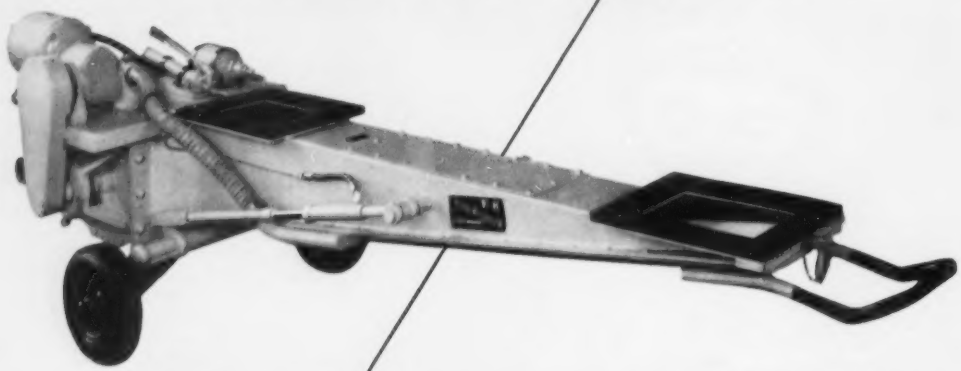
8 LIGHTLY SEALED cans are accumulated in lots of 24 and automatically loaded into traveling tray oven for a 60-min. bake.



Transferring flour from Airslide car to Airslide bulk flour van.



THE NEW FULLER AIRSLIDE® TRANSFER UNIT



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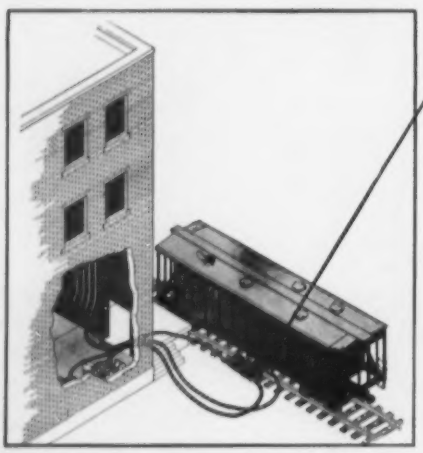

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The advantages of flour in bulk are now—through the Fuller Airslide Transfer Unit—at your doorstep. To get the complete details of the Fuller Airslide Transfer Unit send for Bulletin TU-1, *wherever your plant is located.*

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These Crane valves stay tight on soap oils and fatty acids

THE CASE HISTORY—Leakage through valve seats in raw materials supply lines posed a serious problem for Davies-Young Soap Co., Dayton—makers of various type soaps and cleaning fluids. Unwanted materials leaking past metering stations would infiltrate processing vats.

Four different makes of valves were tried before these Crane valves were installed. With all four, results were the same—seat leakage developed quickly; the valves lasted no more than 4 to 8 weeks.

Valve replacement costs were a factor on top of production losses.

The condition was remedied on installation of Crane No. 1670 Ni-Resist cast iron valves in January 1954. Eighteen months later—with no piping maintenance and no shutdowns whatsoever—the Crane valves are still holding tight. And they show no deteriorating effects from the fluids handled.

Crane Ni-Resist gates don't *look* much different from similar valves of other makes. Their difference is in properly designed, accurately finished seating of 18-8 SMo stainless steel—plus the *extra* erosion-corrosion resistance of Ni-Resist bodies and bonnets cast by Crane. Thrifty buyers know these valves have no "equal" for handling many hard-to-hold, mildly corrosive fluids.

You should have the new folder (AD2047) on these valves. Ask your local Crane Representative for a copy, or write to address below.

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Business Investment Holds Key To Both Growth and Stability

What federal tax policy will best promote both growth and stability in the American economy? The Joint Economic Committee of Congress has been asking this crucially important question in public hearings. This editorial suggests one vital part of the answer.

The proposition advanced here is that—

> Tax policy must encourage a continuing high level of business investment in new plant and equipment, because such investment makes a special contribution to *both* economic growth and economic stability.

Growth Needed for Security

We must have both growth and stability.

A vigorous economic growth is essential to our national security. As Congressman Wilbur D. Mills said in launching the Joint Committee's hearings, "The present complexion of world affairs places a premium upon strength and growth in our national economy." Growth is likewise a major ingredient of a healthy domestic economy. Growing enterprises and growing communities offer far more opportunities for satisfying careers than those which are not growing.

A reasonably stable economy, without violent ups and downs, is also essential to our national welfare. Extravagant booms and their more or less inevitable result, severe depressions, waste labor and resources and cause great human misery. Both major political parties have accepted the obligation imposed by the Employment Act of 1946, that the federal government work to maintain high and stable employment.

There is general agreement that **the key to economic growth is investment in new plant and equipment.** Growth depends decisively on new facilities to increase production, and also to produce new and better products in new and better ways. At the same time, new plant investment provides employment for the important, and well-paid, one-fourth of our industrial workers who manufacture and build new production facilities. So if the process of business investment is kept on an even keel, the result is not only growth but also stability in a substantial sector of our economy.

But authorities disagree on the possibility of maintaining a high level of business investment for any great length of time. Some fear that it will lead to an excess of producing capacity and the glutting of markets, with recession or depression not far behind.

The history of our country offers some basis for the fear that it is dangerous to maintain a very high level of business investment. There have been times when the economy has suffered under the weight of excess producing capacity. **This fear, however, has been made obsolete by the recent course of our economic history which, in its earlier phases, nourished the fear.**

The World Has Changed

Here are some of the major considerations, cited at the Joint Committee hearings, which support the conclusion that we not only *can have* a high level of business investment and economic stability but that we actually *need* a high level of such investment to assure stability.

(1) Over the next 20 years our population is expected to increase by about one-third. But most of the population increase will come in age groups younger or older than normal working ages, and people will probably work fewer hours per week. Thus hours worked are not expected to increase more than 15%. Consequently, we must have a relatively large increase in the amount of production equipment per worker if our standard of living is not to suffer. This means a high level of new investment.

(2) About half of our present business investment goes to replace worn-out equipment, rather than to expand capacity as was true during the early stages of our industrial development.

(3) Thanks largely to the impact of organized research—for which we as a nation now spend about $4 billion a year—a large share of capital investment now goes to provide new products and new processes, rather than to expand existing capacity.

These developments make it unlikely that we shall develop the burden of excess capacity that plagued the economy in earlier periods. **Moreover, most capital investment plans are now made on a long-range basis. Companies are building facilities to anticipate their needs for several years ahead.** This increase in long-range planning has reduced the disturbing effects of temporary shortages and excesses in producing capacity.

The record of recent years speaks for itself. Business spending for new plant and equipment in 1955 was over $29 billion. This continued the high level of investment that has been maintained for the past ten years—a decade remarkable for both impressive growth and gratifying stability. A McGraw-Hill survey of preliminary plans for 1956 indicates another year of increasing investment, and expanding business activity.

Tax policy, to be successful, must consider this impressive contribution of business investment to both growth and stability.

Of course, the level of investment depends on many factors other than federal tax policy. The degree of business confidence is important. So is the strength of consumer markets. So is the attitude of organized labor toward the use of more efficient machinery. But tax policy is a crucially important factor. And it is becoming more so with new developments in our changing economy. These developments indicate that tax policy **must be geared to foster a high level of business investment, if the dual objectives of economic growth and economic stability are surely to be attained.**

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments that are of particular concern to the business and professional community served by our industrial and technical publications.

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Donald C. McGraw

PRESIDENT

McGRAW-HILL PUBLISHING COMPANY, INC.

Aluminum Foil Packaging as a Moisture Vapor Barrier

Report No. 2 of a Series by Reynolds Metals Company

Laboratory tests in great number have proved the low moisture vapor transmission rate of aluminum foil itself and of foil in combination with other materials. More interesting, however, is the case history of a product exceptionally susceptible to damage by moisture, with test results of different packaging materials.

The subject chosen is one of the new chlorine-bearing detergents, now increasingly popular. Specifically, it is a national brand product submitted by the manufacturer to Reynolds Research and Development Laboratory at Richmond, Virginia, for testing.

Chlorine-bearing detergents depend for their effectiveness on a very high degree of protection against moisture pickup. Moisture, even in very slight amount, reacts with the detergent to release the chlorine. Moisture vapor transmitted through certain types of packaging can readily cause this deterioration.

The charts and photographs on the right describe fully the results obtained. The overcoated foil overwrap was finally adopted rather than the uncoated one in order to provide additional protection for the inks and thus to prevent marring in transit and in handling.

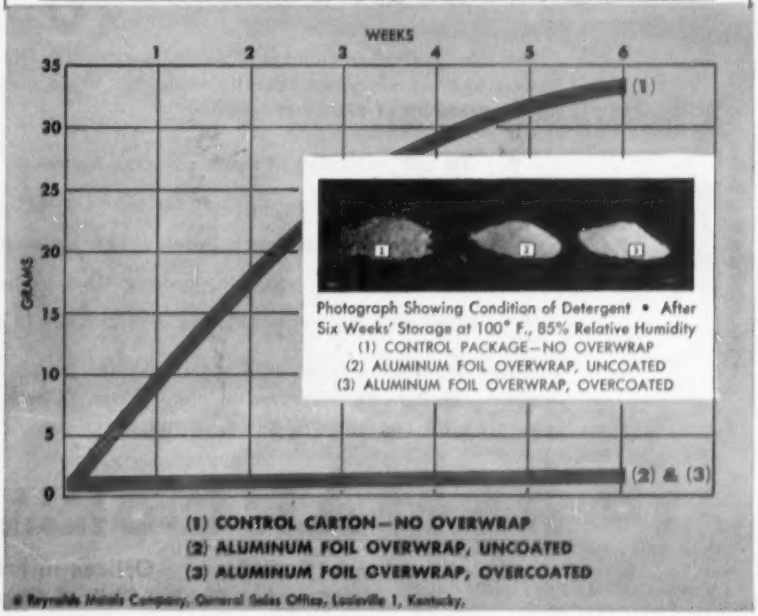
Whether your packaging problem involves moisture gain or loss, contact your Reynolds regional representative so that these Research and Development Laboratory services may be made available to you.

PER CENT AVAILABLE CHLORINE IN DETERGENT BEFORE AND AFTER SIX WEEKS' STORAGE AT 100° F., 85% RELATIVE HUMIDITY

PACKAGE TYPE	WEEKS STORAGE				
	INITIAL	1	2	4	6
(NO OVERWRAP CONTROL CARTON)	2.31	1.98	1.98	0.92	0.91
ALUMINUM FOIL OVERWRAP, UNCOATED	2.31	2.25	2.17	2.02	1.97
ALUMINUM FOIL OVERWRAP, OVERCOATED	2.31	2.19	2.11	1.97	1.94

AVERAGE WEIGHT GAIN (GRAMS) OF PACKAGES OF DETERGENT STORED FOR SIX WEEKS AT 100° F., 85% RELATIVE HUMIDITY

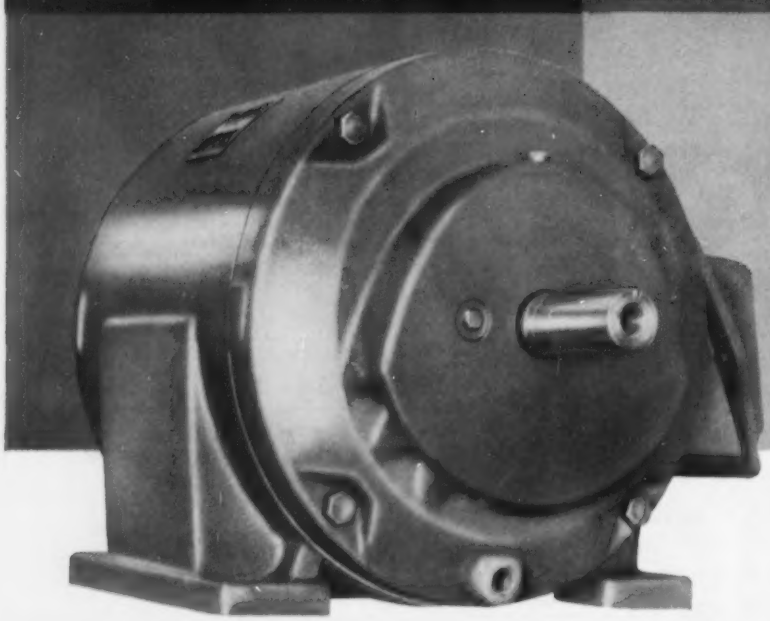
PACKAGE TYPE	WEEKS STORAGE					
	1	2	3	4	5	6
(NO OVERWRAP CONTROL CARTON)	8.8	15.1	22.6	28.3	31.1	33.5
ALUMINUM FOIL OVERWRAP, UNCOATED	0.2	0.3	0.5	0.8	1.0	1.2
ALUMINUM FOIL OVERWRAP, OVERCOATED	0.2	0.4	0.6	0.9	1.0	1.1



Photograph Showing Condition of Detergent • After Six Weeks' Storage at 100° F., 85% Relative Humidity
(1) CONTROL PACKAGE—NO OVERWRAP
(2) ALUMINUM FOIL OVERWRAP, UNCOATED
(3) ALUMINUM FOIL OVERWRAP, OVERCOATED

© Reynolds Metals Company, General Sales Office, Louisville 1, Kentucky.

Totally Protected



FROM CORE TO COVER

RELIANCE *Totally-Protected* MOTORS

The total protection concept of design and construction armors Reliance A-c. Motors against everyday hazards, with little or no maintenance. Total protection is made up of extra features like:

Slot cell insulation of Double Backed Mylar

Dynamically balanced rotor for vibrationless operation

Entire insulation system impervious to acids, moisture and oils

Metering plate regulates grease flow to bearing

Ventilation louvres positioned high and dry in end brackets

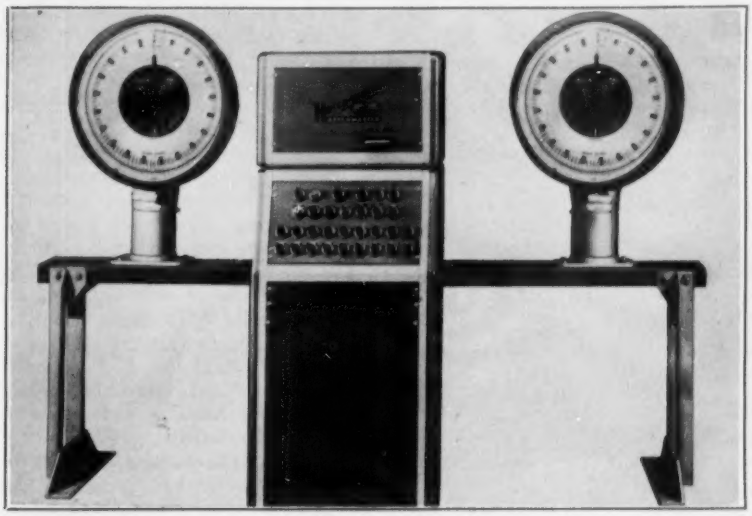
There are 100 of these extra core to cover protection features in Reliance Motors. Each point is covered in our bulletin, "Check the Facts". Why don't you write for one and get all the details? B-1810

RELIANCE ELECTRIC AND ENGINEERING CO.

Cleveland 10, Ohio • Offices in Principal Cities

Canadian Division: Welland, Ontario

NEW EQUIPMENT & SUPPLIES



AUTOMATIC BATCHING, with unlimited combinations of material weights and selections, is controlled from this compact console—about the size of a standard filing cabinet.

OPERATOR merely inserts punched card to activate the system. Then controls in the unit operate gates and valves to weigh out the desired mix. Lights indicate which gates are in operation. In addition, there are pushbuttons to permit manual control.

Electronic Batching System Is Punch-Card Controlled

For fully automatic bulk weighing that offers speed, accuracy, and consistency, this new electronic batching system combines commercial weighing units with IBM punch-cards.

Known as the Helco-matic Batchmaster, it permits unlimited combinations of material weights and selections, which can be changed instantaneously. Automatic recycling provides for repetitive batches.

In addition, the system offers a means for establishing full inventory control, recording, accounting, and costing and billing through efficient business-machine methods.

The unit is housed in a compact console, no larger than a standard filing cabinet. It may be located adjacent to, or remote from, the actual weighing operation. Although not required, remote-indicating dials can be furnished.

IBM punched cards are used for predetermining the selections and weights of material. Here is how the system operates:

First, customer-identification data is entered in the spaces provided on the card. Then, dry weights of ingredients are listed. These figures are quickly converted to the necessary perforations by office personnel. A simple key-punch system is used for this operation. From that point, the automatic system takes over.

To process the batch, an operator simply inserts the punched card into a slot on the control panel. This automatically activates the system, then controls the operation of gates and valves as the batch is being compounded. Lights above the pushbuttons on the control panel indicate which gates are functioning, and selection can be changed instantaneously by inserting another card.

Furthermore, the system eliminates the problem of compensating for moisture by weight. A control dial conveniently located on the console is set to add the amount of compensating material. At the same time, it deducts from the water batch the amount of water included in the compensating material. A setting of this dial is changed only when a change in moisture content occurs.

An electronically controlled closed circuit minimizes malfunctioning of the system due to vibration, moisture, or dust. Actually, the system is designed for rugged industrial applications. And pushbuttons for all controls enable manual batching of individual material.

Mechanical components, such as the positive-acting gates and valves, are designed for high weighing accuracy. Also, controls inherent in the system provide checks that minimize downtime.

To facilitate maintenance, all major components are grouped and set on individual drawers which can be quickly removed. Or, they are mounted on panels that swing into position for easy repairing.—*Heltzel Steel Form & Iron Co., Warren, Ohio.*

Circle 113A on Reader Service Card

Fork-Truck Clamp Rotates To Handle Drums Quickly

A new rotating drum-handling attachment for fork trucks employs specially designed rubber-coated clamp arms for extra versatility. The 2,000-lb. capacity unit is termed particularly effective where quick horizontal placement or stacking is desired.

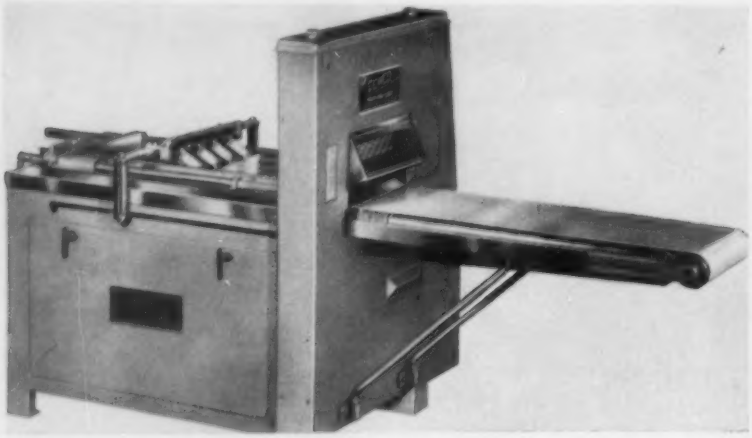
One arm of the attachment is shaped with two concavities that fit the shape of a drum. The other is flat-surfaced and tapered slightly so that drums roll into position when clamp-

ing pressure is released by operator.

The unit rotates through a 90-deg. arc to permit lifting of drums in the vertical position and stacking them horizontally. It handles two drums in this manner, but when used to pick up, transport, and stack drums vertically, it can take four drums at a time.

Clamping range of the 42-in.-long arms is from 17⅜ to 71⅜ in.—*Yale & Towne Manufacturing Co., 11,000 Roosevelt Blvd., Philadelphia 15, Pa.*

Circle 113B on Reader Service Card



Rapidly Slices Frozen Fish and Meat Blocks

Offering accurate and uniform slice thickness, this automatic slicer cuts frozen meat or fish blocks into steaks, patties, or sticks.

Unit (Gemco) operates at 72 strokes per min. in handling blocks up to 5 in. high and 16 in. wide. Multiple feed with blocks up to 3 high enables production of 72-864 cuts per min. Further, by using a knife with shear cutting action (rather than a saw) this slicer eliminates product discoloration, flaked surface, and sawdust waste.

Blocks are loaded onto the table (left in photo), then conveyed to the cutting blade, and slices emerge at the opposite end ready for packaging. Cutting table and discharge belts are on the same level, which eliminates possible product breakage through dropping.

Slice thickness may be varied in 2-3 min. by turning a knob. Adjustments range from ⅛-1 in. or 1-1½ in. Cuts can be held to desired weight since slicing action eliminates slivers.

Unit is totally enclosed, while all parts contacting the product are of stainless steel or chrome plate. Said to meet all sanitary requirements, machine is easily cleaned with steam or hot water.

Floor space required is 3 ft. 7 in. x 8 ft. 3 in. Equipped with 3-hp., 3-phase motor and switch (220/440 v., 60 cycle), slicer is ready to operate on delivery. Maintenance consists of honing the special-alloy blade once a week and regrinding after several months of operation.—*General Machinery Corp., P. O. Box 285, Sheboygan, Wis.*

Circle 114A on Reader Service Card

Pneumatic Carton Stapler Cuts Packaging Costs

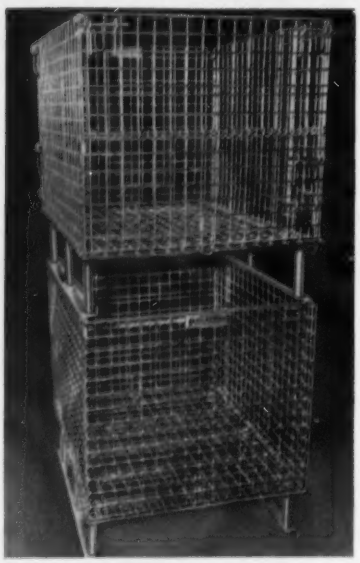
Design simplicity of this air-operated stapler, which makes secure fastenings from the outside, is said to cut carton-closing costs.

Material and labor are saved as unit (Actuated Anvil, Model PA) spaces large staples 5 in. apart. Each is automatically positioned, then driven and clinched in one coordinated movement of the anvils. Latter pierce the board and move underneath to receive staple points as they are driven. Double or triple thicknesses of corrugated or solid fiberboard are easily fastened without damage to container contents.

Unit has only five moving parts and a simple mechanical linkage. Chassis is of stainless steel, while all wearing surfaces are chrome-plated. Standard magazine capacity is 100 staples; crown, 1⅜ in.; leg ⅜ or ¾ in. Dimensions: Height, 11½ in.; length, 13½ in. (with double-length magazine. —200 staples—24 in.); width, 4¾ in. Weight is 9½ lb.

Accessories include air lubricator and filter, fittings, and 10 ft. of hose. Air-pressure requirement is 50-60 psi. —*Container Stapling Corp., P. O. Box 247, Herrin, Ill.*

Circle 113B on Reader Service Card



New Food-Handling Unit Has Sanitary Design

Ease of sanitation is stressed in the design of this improved food-handling unit (Palletainer).

Its understructure has tubular legs that can be easily and thoroughly steam cleaned. Also, combination floor runners and stacking channels are turned up on the inner edge and down at the outer edge. This eliminates surfaces which might collect debris or moisture, and provides fast, safe stacking.

Unit is available in special underclearances and a variety of sizes and types for special processing, handling, or freezing applications.—*Union Steel Products Co., Albion, Mich.*

Circle 114C on Reader Service Card

Joint Transmits Torque Around Sharp Bends

Termed much lighter and more efficient than previous models, this geared joint transmits torque around sharp bends in any angle from 45 to 315 deg.

Actually an adjustable gear box, it has needle bearings which are said to increase efficiency about 60%. At present, unit is used primarily for making sharp bends in valve remote-control linkages which use flexible shafting or reach rods. Sharp bends often are necessary to avoid obstacles.

Operator installs the joint by merely connecting each end to either flexible shafts or reach rods, brackets the unit in place at one end, and then drills a spot for a set screw to keep both halves of the joint at the proper angle. With needle bearings, unit can be used for power applications with speeds up to 500 rpm.

Joints are available in three sizes: ½-1⅜ in. dia. for flexible shaft, ½-1½ in. dia. for rigid rod. Operating torques are 500-3,500 lb.-in.—*Stow Mfg. Co., 322 Shear St., Binghamton, N. Y.*

Circle 115A on Reader Service Card

Slide Rule Is Colored For Easier Reading

Eyestrain from reading fine slide-rule calibration may be prevented by the green-yellow coloring of a new light-alloy rule.

Called Eye-Saver, it employs this color to eliminate reflection of blue, red, and violet rays, which do not focus exactly on the retina. Use of metal offers accurate (to 7 decimal places) and permanent calibrations. In addition, the rule does not pick up moisture to swell, warp, and stick.

Non-rusting units are made in 6 and 10-in. standard rules (Trig., Log-Log), or to special order.—*Pickett & Eckel, Inc., 1109 S. Fremont Av., Alhambra, Calif.*

Circle 115B on Reader Service Card

Self-Checking Monitor Has Broad Application

A dynamic monitoring technique, which checks itself by a simple pulsation method, is offered for a variety of systems—fire detection, machine-safety control, furnace-flame monitoring, photocell-intrusion alarm, and liquid-level control.

Conventional static systems may readily be adapted to the new method since it requires few additional components. Also, it is sufficiently basic to be used with electronic, electrical, mechanical, pneumatic, hydraulic, and nuclear systems.

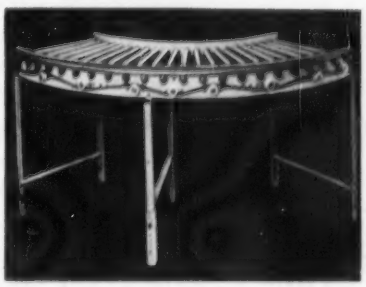
The monitor continually checks itself by periodically simulating the dangerous (unsafe) condition it is designed to detect. If it responds promptly to this simulated danger, it is sure to respond to the real danger when it occurs. An alarm-suppression circuit built into the monitor holds off the warning signal during the short period of simulated danger.

A simulated unsafe condition is introduced as a continual safe-unsafe-safe-unsafe oscillation which holds the alarm off. Failure of the safe condition being sensed or of the monitoring system itself halts the required safe-unsafe oscillation and sounds an alarm or initiates corrective action.

Typical examples: A photocell circuit designed to detect absence of light is tested by periodically interrupting the light beam; a temperature-monitoring system is checked by pulsing the heat source in the vicinity of the detector, and operability of a float-type, liquid-level monitor can be proved by sinking the float every few seconds with a solenoid-actuated plunger.

Oscillations may be caused by a free-running perturbation device at the monitor input, or by use of feedback. Period of oscillation can be adjusted to meet requirements of the particular control system, and may range from hours to microseconds.—*Scully Signal Co., Electronic Div., Melrose, Mass.*

Circle 115C on Reader Service Card



Roller Curves Eliminate Conveyor-Line Jams

Package flow on curved conveyors may be sped to 90 fpm. by means of 90- and 180-deg. power roller curves.

Units can be chain-driven from a

HOW BAKERY ENGINEERS SECURE GREATER DONUT PROFITS

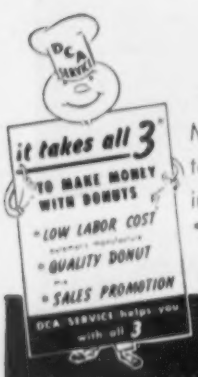
With today's strong competitive selling, it is the bakery engineer's job to obtain larger profits through lowering manufacturing costs.

Example: *A large Eastern donut baker in a low-priced, competitive area, was having a battle making money in donuts. With the help of DCA engineers, he set up an entire automatic operation and so reduced his operating costs that today he is making a substantial profit on his donut making operation.*

DCA's renowned research laboratories (world's largest in its field) in developing a better mix, tailored to the needs of their market; have called in DCA's expert engineering service to help them design and set up the most modern automatic equipment; are utilizing DCA's highly successful sales promotion techniques to build sales.

With the new, revolutionary DCA Automatic Proofing and Automatic Cooling (recently displayed at the Atlantic City Exposition) automatic donut making has reached its highest peak of efficiency.

No organization is as well equipped as DCA to help you achieve top quality control and build greater profits on donuts through low cost manufacturing methods. Let's talk it over!


DCA SERVICE
it takes all 3*
TO MAKE MONEY WITH DONUTS
• LOW LABOR COST
• QUALITY DONUT
• SALES PROMOTION
DCA SERVICE helps you with all 3

*it takes all 3**

TO MAKE MONEY WITH DONUTS!

Many successful bakery engineers—seeking to build greater donut profits—are employing DCA* MIX,* AUTOMATIC EQUIPMENT, *MERCHANDISING. They have been using

DOUGHNUT CORPORATION OF AMERICA

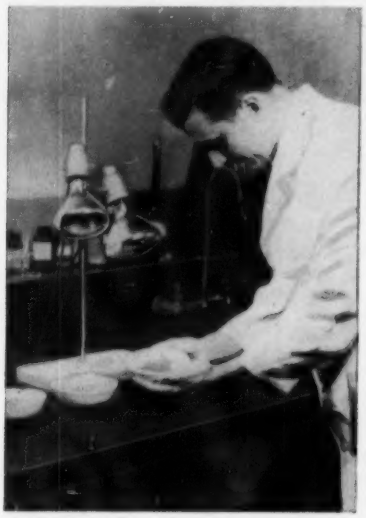
45 West 36th Street, New York 18, N. Y.

West Coast—1255 67th Street, Oakland 8, Cal. *Canada*— 579 Richmond Street W., Toronto, Ontario

½-hp. motor or conveyor head shaft, and slip is curbed since the driven chain engages sprocket teeth permanently attached to the conveyor roller. Positive drive improves the material flow to eliminate manual clearing of jam-ups on turns.

Curves are offered with rollers set high or low to accommodate various types of packages, and maintenance is said to be low. A transparent, plastic chain guard on the outside of the curve that encloses moving parts to protect personnel also aids in visual inspection.—*Harry J. Ferguson Co., Jenkintown, Pa.*

Circle 115D on Reader Service Card



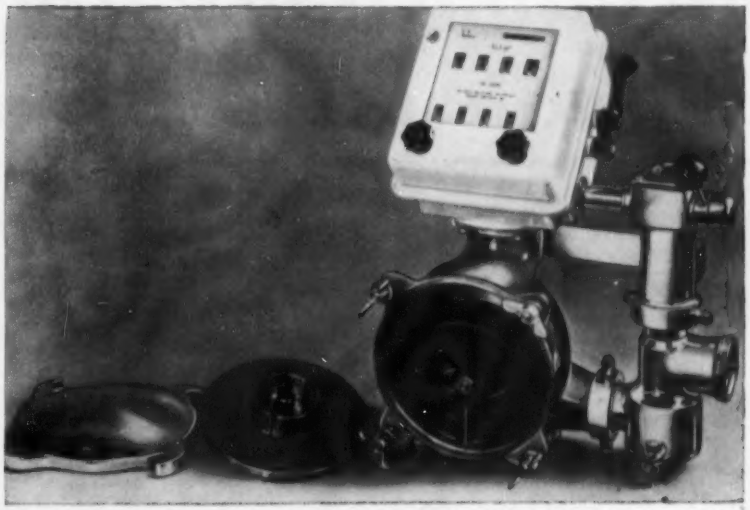
Infra-Red Lamp Swivels For Easier Lab Use

Greater convenience in drying and evaporating in the laboratory is offered by this infra-red heater with multi-directional clamp and socket.

When attached to a support rod, unit's 250-w bulb can be aimed horizontally through 360 deg., and vertically through 300 deg. In addition, the lamp (Economy Heater) can be raised and lowered on a support stand to control the amount of heat delivered.

Compactness is another plus factor. Built-in reflectors save space, thus a group of heaters may be attached to the same support for mass evaporations, or for use over extra-large dishes. As an added convenience, the whole assembly (socket, clamp, and bulb) can be stored in a drawer. Heater operates on 115v. a.c. or d.c.—*Fisher Scientific Co., 345 Fisher Bldg., Pittsburgh 19.*

Circle 117A on Reader Service Card



Accurate Milk Meter Is Easily Cleaned

Sanitary design, accuracy, and ease of handling are advantages cited for a German rotary-piston-type meter. Applications include volumetric measurement of fluids such as milk, juices, and syrups.

Called Siemens, it operates with minimum pressure loss and may readily be disassembled for cleaning. A setting register with shut-off valve is also available for stopping flow automatically after a predetermined volume has been delivered.

This register has a four-figure roller counter which can be reset to zero by a lever. Capacity is 9,999 gal. with one rotation of the lowest roll corresponding to 10 gal. Two hands rotating above two concentric scales indicate 10 gal. and 200 gal. respectively.

The meter comprises a measuring chamber with inflow and outflow pipe connections, rotary piston located eccentrically in the chamber, and a counter with register. Motion of the piston caused by flow of liquid is transmitted to the counter by a magnetic coupling. Therefore, the chamber's back wall is solid metal without a stuffing box. It is opened for cleaning by loosening four wing nuts on the casing.

Metering action depends on continuous filling and emptying of a space bounded by chamber wall, piston, and a radial partition wall between inflow and outflow opening. The piston pin rotates about a pin in the center of the chamber. Thus, during each rotation a definite quantity of liquid corresponding to the gage-space volume flows through the meter.

Built for 2-in. pipe connections, units are of cast bronze or stainless steel. The piston is made of a plastic that is non-absorbent, non-toxic, and crack-resistant. — *Distributed by T. E. A., Inc., 141-21 72nd Ave., Flushing 67, N. Y., and in midwest by Chicago Stainless Equipment Corp., 5001 Elston Ave., Chicago 30.*

Circle 117B on Reader Service Card

Solids Moved Uniformly With Compact Vibrator

Combining a powerful permanent magnet with an a.c. electromagnet, this new type of unit vibrator operates at 3,600 vpm. and needs no rectifier. Called HI-VI, it is offered for uniform flow in bins, hoppers, or chutes handling dry materials in lump or powdered form.

Unit sets up a rapid "double-diaphragming" or kneeding action in the bin wall to expand its lower half, while compressing the upper. This action prevents sticking, arching, or bridging of materials, and imparts a

We broke these truck axles in the lab...

In the INTERNATIONAL Engineering Laboratory, axle shafts are tested by twisting them back and forth—hundreds of times—at stress points far beyond those of any normal truck operation. Axle shafts are approved for manufacture only when they withstand a prescribed high number of twists. Production line axle shafts must conform to the quality standards set up by this rigid test.

to save you the BIG money!

Pictured above is a group of once fine and costly INTERNATIONAL axle shafts that have been purposely twisted and broken. This is done to make sure your INTERNATIONAL rear axle will last longer and save you the BIG money—the over-the-years operation and maintenance money.

This rigorous axle-twist test is but one of many operations in the chain of INTERNATIONAL engineering that makes INTERNATIONALS *all-truck*. There are no passenger car compromises *anywhere* in INTERNATIONAL design, no passenger car engines or components asked to do a truck job.

And beyond this big plus of all-truck design, INTERNATIONAL gives you functional, practical, money-saving styling—extra comfortable driver-saving cabs—every modern driving feature.

If you use a truck to make money, see your INTERNATIONAL Dealer or Branch and start saving the BIG money!

INTERNATIONAL HARVESTER COMPANY • CHICAGO

Model R-195 ROADLINER,® GCW 50,000 lbs. In the world's most complete truck line there are models exactly right for every highway hauling job. Conventional and COE, 4- and 6-wheel ROADLINER models, 29,000 lbs. to 76,800 lbs. GCW.

INTERNATIONAL® TRUCKS

All-Truck Built to save you the BIG money!

Motor Trucks • Crawler Tractors • Industrial Power
McCormick® Farm Equipment and Farmall® Tractors

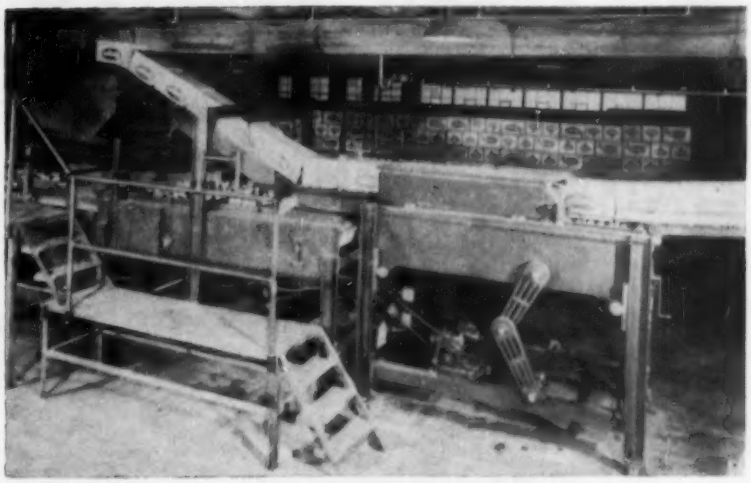
pulsating directional thrust that promotes flow.

The compact vibrator has an aluminum housing that precludes airborne particles and moisture. It is designed for easy removal to permit inspection of internal parts when the unit is in operation.

Two sizes are available in 115 or 230v.: Model EU-20 (photo), for 7-cu.-ft. bins of up to ⅛-in. wall thickness; and Model EU-30, for 20-cu.-ft. bins of up to ⅛-in. wall thickness.

Installation of units on equipment of any shape or size is termed quick and easy. The cast semi-steel base to which the vibrator is fixed has three machined pads that offer proper mounting on any irregular surface. Mounting holes are readily accessible with any type of wrench.—*Eriez Manufacturing Co., Erie 6, Pa.*

Circle 117C on Reader Service Card



Automatically Unloads, Unscrambles Empty Cans

A new unloading mechanism in this automatic empty-can unloader and unscrambler is said to cut operating time and labor costs. Furthermore, the machine requires little supervision.

In operation, reshipper cases of cans are inverted on a gravity conveyor and fed to the unloader. Flaps are opened automatically and cases are gradually raised by two take-off channels. Then without damage, cans slide from cases onto an unloading belt. Meanwhile, empty cases are automatically turned upright and moved toward packing areas for reloading with finished goods.

After cans discharge from cases, they are conveyed through a separating mechanism that channels and spaces them onto a series of moving belts equipped with guide rails. These, in turn, pass the cans under a set of hooks designed to catch their open ends and turn them around so that all cans are aligned with the closed-end forward.

Cans then advance toward a collector which takes them from each lane and places them in single file for conveying to filling equipment and subsequent repacking in the original cases.—*A-B-C Packaging Machine Corp., Quincy, Ill.*

Circle 119B on Reader Service Card

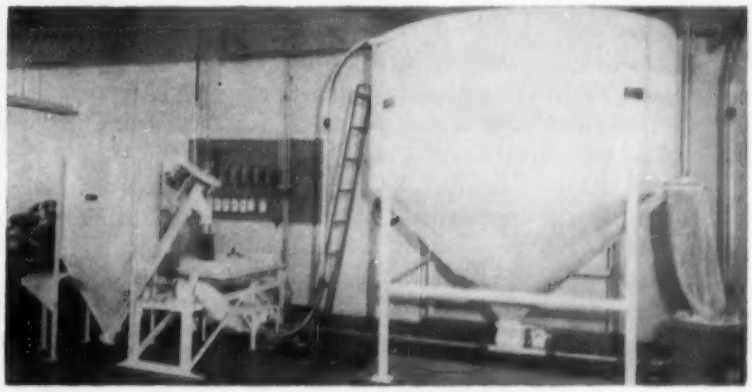
Motorized Lift Eases Materials Handling

This electrically-operated lifter is designed to raise a 1,000-lb. load to a height of 5 ft. 8 in. at 15 fpm. Furthermore, its 39-in. length offers ease of handling.

Rear swivel casters are 8-in. dia., while front rigid casters are 5-in. dia. Side-thrust rollers absorb shock on the 24x24-in. platform.

Hinged door on power cabinet provides easy access to unit's ¾-hp. motor with magnetic-fuse starter. Lifter weighs 455 lb. and is available in battery-powered, hand-hydraulic, and hand-winch models.—*Colson Corp., Elyria, Ohio.*

Circle 119A on Reader Service Card



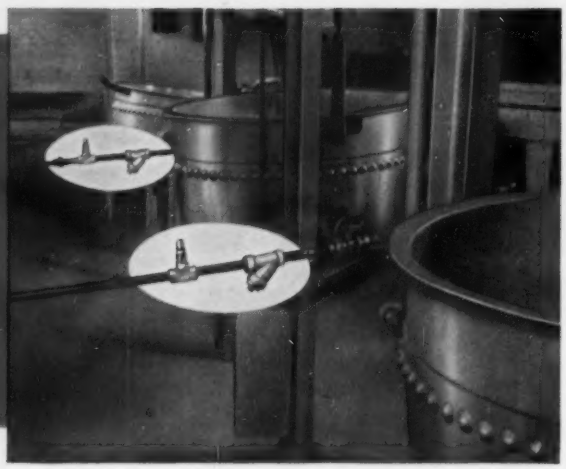
Pneumatic Conveying Cuts Bakery Handling Costs

Handling 100-200 lb. of dry-granular or pulverized material per minute, this pneumatic conveying and storage system (Nu-matic-flo) reportedly minimizes investment through simplified design. Other advantages: Reduced labor requirements, no product loss, and less cleaning. Flour (photo) is received in 100-lb. bags, dumped manually into small bin (left), then goes to sifter via inclined auger. A feeder and blower setup under the sifter elevates it to large storage bin (right). Same blower sends flour up to scale hoppers in mixing room through feeder valve below storage bin.—*Crissey Co., 3639 Main St., Kansas City 11, Mo.*

Circle 119C on Reader Service Card

this candy manufacturer says..*

"We cut fuel consumption 8%
...reduced cooking time 25%
...and produced 2 extra batches per day
with Yarway Impulse Steam Traps"



... In addition, they are now able to use an expensive mixing machine that had been taken out of service because of slow cooking.

Trap users in other industries are reporting similar results from the YARWAY Impulse Steam Trap. It costs so little, it does so much.

YARWAYS get equipment hot in a hurry and *keep it hot.* They have only *one moving part.* All working parts including the body are *stainless steel.* They are *good for all pressures.* They are small, *easy to install, easy to service.* Their initial *cost is low.*

Over 1,000,000 YARWAYS already have been sold. Carried in stock by local industrial distributors. Write for name of one nearest you and for free Trap Bulletin.

*Chester A. Asher Co., Philadelphia, Pa. (Candy Manufacturer)

YARNALL-WARING COMPANY
127 Mermaid Avenue, Philadelphia 18, Pa.

YARWAY

impulse steam traps

Motorized Trolley Offers Dependable Operation

Trouble-free performance under severe operating conditions is the aim of a new line of motor-driven trolleys. They are designed for installation on electrically powered hoists with 1,000-12,000 lb. capacities.

The lightweight, single-speed units (Load Lifter, Series 700) are pushbutton-controlled and range in traverse speeds from 25-130 fpm., depending on size and voltage requirements. Models are available in all standard voltages.

For increased service life, trolleys have section side plates of non-fracturing, rolled-steel plate. Their full-crowned universal traverse wheels with hardened treads are said to operate equally well on wide-flange, standard, or steep-angle I-beams. Drive wheels are integrally cut heat-treated spur gears. Each wheel rotates on two permanently lubricated ball bearings.

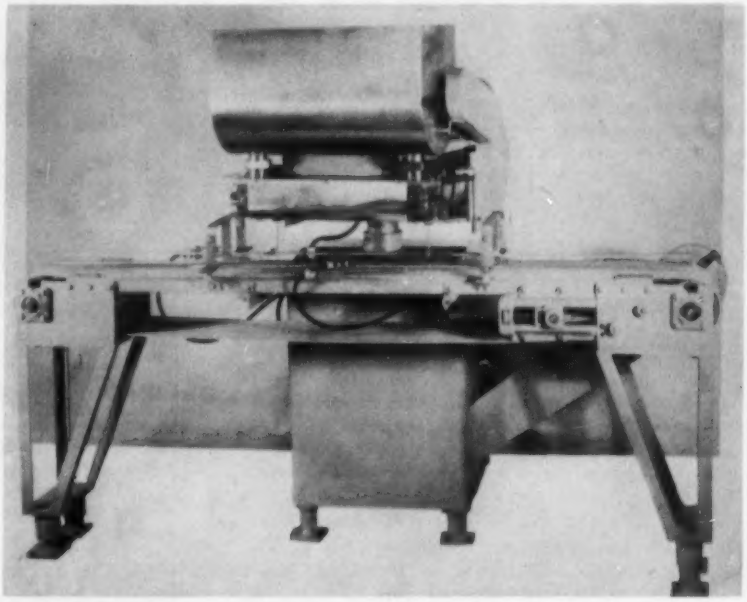
All models are adjustable to fit a wide range of I-beams. This permits relocating a trolley on another installation having a different size I-beam without reworking.

Driving mechanism consists of a 30-min.-rated squirrel-cage motor, face-mounted and totally enclosed. It has self-lubricated tapered roller bearings. The sealed-in, worm-drive unit, permanently lubricated in a bath of oil, requires no adjustment.

A magnetically interlocked 24-v., 4-button control station eliminates damage to the electrical system should both "up" and "down" buttons be depressed simultaneously. Here, low voltages are an important safety factor. Cushion start, by means of adjustable ballast resistors, is available on large capacity trolleys for smooth acceleration.

Trolley is available as a factory-installed unit in combination with any model of maker's hoists. Or it can be purchased separately in kit form for adapting to existing hoists. Kits include all necessary parts and assembly instructions. Installation requires no special tools and takes less than 2 hr.—*Manning, Maxwell & Moore, Inc., Shaw-Box Crane & Hoist Div., Muskegon, Mich.*

Circle 121A on Reader Service Card



Flexible Straight-Line Filler Is Easily Cleaned

Designed to meet the smaller canner's need for a filler that is easily dismantled and cleaned, this two-station straight-line unit handles a variety of liquids and semi-solids. Shorter cleaning time results in longer filling runs and minimum delay in changing from one product to another.

Self-contained unit (Twin) incorporates motor, drive, and conveyor. Valves and pistons are readily dismantled without tools, and no change in parts is necessary for changes in height or diameter of container.

Filler handles cans, jars, and cartons from 4-128 oz., also frozen-food packages. Speeds range from 25-50 containers per min., depending on size. And unit also fills pails when operated manually.

An agitator for the filler bowl is optionally available.—*The Pfaudler Co., Rochester, N. Y.*

Circle 121B on Reader Service Card

Plant Data Logged and Totalized by Electronic Units

Here is a new high-speed electronic system that logs a plant's operating data and adds it up at the day's end —meanwhile keeping a robot eye on quality.

Called Electronic Data Integrating System (EDIS), and initially designed for a petroleum-oil refinery, it is said to be the first of its kind to incorporate computing and quality evaluation with conventional automatic data-handling. Therefore, similar applications are seen for this relatively low-cost unit in the food industry.

In its first installation, the system will monitor production of a commercial solvent, automatically logging such data as temperature, pressure, flow, power consumption, and product quality. It will store and electronically totalize figures for flow and power used, also compute the day's average temperature for a number of critical points—especially important in analyzing flow and over-all operation.

Installed in a central control room, unit is laid out with conventional graphic-panel control boards comprising two 6 ft. x 7 ft. x 2 ft. steel cabinets. One houses some 700 trans-

THERMO KING

introduces its new model "H"

HYDRAULIC-DRIVE UNITS

Thermo King's new Model "H" units for insulated truck bodies are specially designed to operate from power supplied by your truck engine.

This new hydraulic driven truck refrigeration system is simple in design and in operation, making the new Model "H" almost maintenance-free.

New Hydra-Drive units are made in two styles —straight hydraulic drive and a combination hydraulic and standby electric motor drive.

"H" Models are available for all size straight truck bodies and for all temperature requirements.

Here are some of the important features of Thermo King's new Model "H":

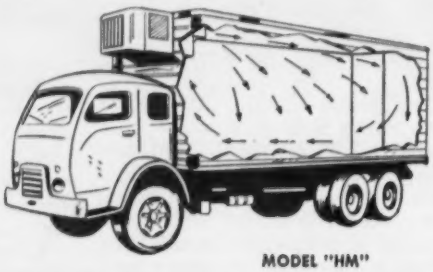
- **LIGHTWEIGHT—as low as 455 pounds; durable and lightweight frame, built for rugged road service**
- **Patented SINGLE-PACKAGE construction—The unit is easily installed and if ever necessary, easily removed without disturbing the cargo**
- **Available with AUTOMATIC DEFROST**
- **AUTOMATIC TEMPERATURE CONTROL—Set your temperature, snap a switch, Model "H" keeps your load at the constant desired temperature**

MODEL "HA"

OPERATION OF NEW MODEL "H"

The spare horsepower developed by your truck engine operates the Thermo King hydraulic pump. This pump is either belt-driven by the crankshaft or driven through power take-off. This specially designed precision Thermo King pump powers the hydraulic motor, which in turn drives the compressor.

This hydraulic motor operates at a constant speed whether your truck engine is idling or fully accelerated. Thus, there is no variation in the refrigeration capacity of the unit.



MODEL "HM"

Refrigeration with new Model "H" as shown in the sketch above by "forced convection" cooling. The air in the truck is drawn through the cooling coil where the heat is removed. The cool air is then blown back into the truck body and over the cargo. The air moves downward, under and around the lading, and again flows through the cooling coil. Model "H" is another important advancement in transportation refrigeration by THERMO KING!

Please send me complete specifications on the new THERMO KING Model "H". FE

Name_____

Company_____

Address_____

City_____ State_____

Mail to:

THERMO KING

44 SOUTH 12th STREET

MINNEAPOLIS, MINN.

West Coast Branch: 2011 E. 65th Street, Los Angeles, California

ducers that convert pneumatic signals into electrical signals. The other contains electrical equipment to convert these signals into numbers and to perform electronic computing functions.

Signals are fed to an operator's console desk. Latter is flanked by two electric typewriters that automatically type out records, generally once an hour. Flow and power measurements are also punched on tapes for later use in cost-accounting.

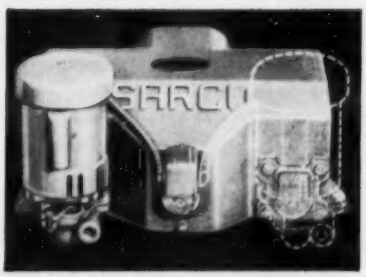
When not actually recording, the system monitors a number of critical points to keep track of conditions and to pick up any deviations as they arise. They are immediately spotted on an "annunciator's panel" at the operator's desk.

Quality, in this case purity of the solvent, is measured by converting the desired quality into an electrical signal. This is constantly picked up on recording machines. Should it slip below the desired level, an alarm sounds.

It is pointed out that this system supplements—rather than supplants —regular operators. By centralizing all current operating data at one point, it minimizes the strain on operators who otherwise would have to manually collect data from many different locations.

This walk-around method is not only time-consuming, but forces the operator to neglect the log sheet in an emergency. Later, the engineering department finds critical data missing, which reduces the value of records for analysis. Also, humans are not always fast enough to pick up variations as they occur.—*Minneapolis-Honeywell Regulator Co., Industrial Div., Wayne & Windrim Aves, Philadelphia 44.*

Circle 121C on Reader Service Card



New Condensate Pump Is Efficient, Versatile

Designed for dependable, quiet, and rapid discharge of hot condensate to the boiler, this line of close-coupled centrifugal pumps offers capacities of 3-12 gpm. Required floor space is 27x28½ in.

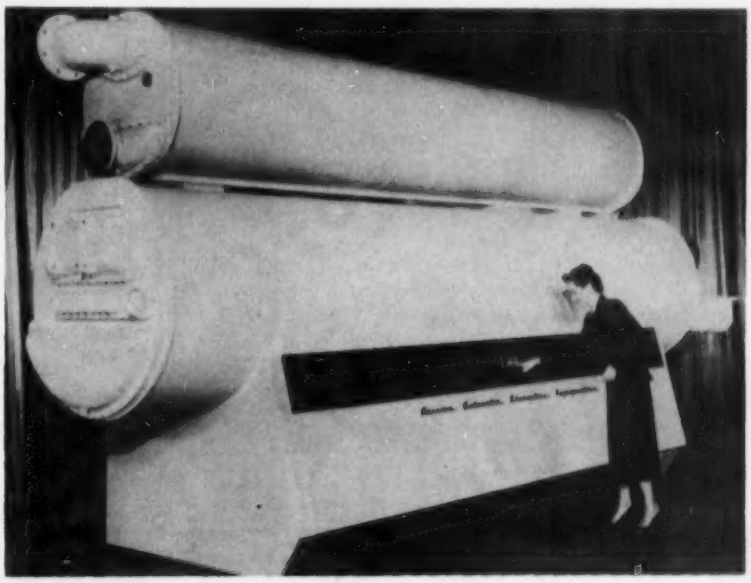
Bronze-fitted units (Type S), with 12-gal. cast-iron receiver, are easily converted from single to duplex (photo). Inlet height is only 7¼ in. above the floor, while a 3450-rpm. motor is mounted high above, away from water and dirt. No sub-base is required as mounting lugs are cast integral with receiver.

Pump is self-venting through an oversize suction inlet to permit handling of high-temperature condensate without vapor lock. It is easily disassembled without disturbing pipe connections by removing three bolts.

A mechanical alternator furnished with the duplex unit provides automatic sequence operation — both pumps on heavy loads or alternate pump when one is inoperative.

Other advantages cited: Bronze impeller, dynamically balanced and enclosed; replaceable wear ring; mechanical seal; stainless pump shaft, and seamless copper float with stainless rod.—*Sarco Co., Inc., Empire State Bldg., New York City 1.*

Circle 123A on Reader Service Card



Pushbutton Absorption Cooler Uses Low-Cost Steam

A new line of automatic "pushbutton" absorption refrigerating machines, which produce chilled water from steam, are available in a range of models with capacities from 100 to 700 tons.

Used in air conditioning and process cooling systems, units have no major moving parts and employ plain water as refrigerant. They can be controlled by a time clock, thermostat, or pushbutton.

Machine adjusts automatically from full capacity down to zero load, and back to full load again, with little loss in efficiency. Overloading does not hurt the unit. Should cooling beyond design capacity be required, machine continues to deliver additional tons of refrigeration at a higher than design temperature.

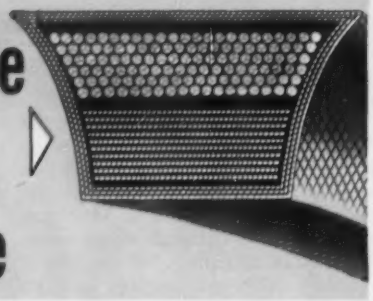
Due to the minimum number of moving parts and light weight of the equipment, these quiet machines can be installed on rooftops and upper-floor locations. Or, they can be placed high on the steelwork of an industrial plant close to the process where cooling is required.

Unit is termed particularly economical to operate wherever a low-cost source of heat, such as natural gas, is available to provide steam. Low pressure steam may also be obtained from back-pressure turbines or from exhausts of processing operations. Although steam is most generally employed, any hot fluid such as water, oil, or various chemicals may also be used.

New design eliminates many of the major service lines and all of the external auxiliary piping normally assembled at job sites, thus substantially reducing the time and the cost of installation.—*The Carrier Corp., Syracuse, N. Y.*

Circle 123B on Reader Service Card

Why this curve lengthens V-belt life



THE CONCAVE SIDES (U.S. Patent 1813698) of every Gates V-Belt are a precisely engineered curve. This curve greatly lengthens V-belt life for this interesting reason:

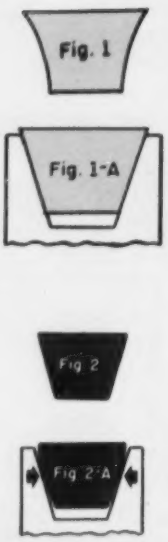
When you bend a Gates V-Belt, just as it is bent around a sheave, the concave sides (Fig. 1) become straight. Therefore, the belt makes full contact with the sheave, gripping the sides evenly (Fig. 1-A) and wear is distributed uniformly across the sidewalls of the belt. Naturally, uniform wear lengthens belt life; saves on replacement costs and cuts down-time.

Now see what happens when you bend a straight-sided belt. (Fig. 2) Just feel the sidewalls *bulge out* at the bend. The bulge causes *uneven* contact with the pulley, as in Fig. 2-A. And uneven contact causes excessive wear at points shown by arrows; belt life is shortened.

Cut costs by getting longer wear from your V-belt drives. Specify Gates Vulco Rope—the V-belt with concave sides. Your nearby Gates distributor will supply your needs promptly. The Gates Rubber Co.—*World's Largest Maker of V-belts.*

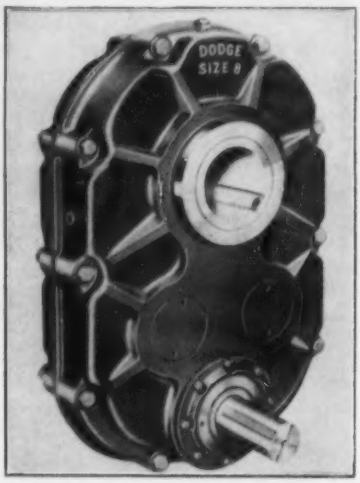
There are Gates Engineering Offices and Distributor Stocks in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA-74



Gates Vulco Rope Drives

Equipment & Supplies



New Units Extend Capacity Of Speed-Reducer Line

Maximum rated horsepower of this line of shaft-mounted speed reducers has been increased 40% by addition of two new models. Capacities now range from 1-60 hp., output speeds from 12-365 rpm.

At one end of the double-reduction series is the No. 8 with 60 hp. at 100 rpm., AGMA rating. It can be mounted on shafts up to 5 in. dia. At the other end is the No. 11 with 1.3 hp. at 100 rpm.

These new sizes have all the advantages of the maker's standard line. They require no foundation, flexible couplings, or sliding base, and there are no lining-up difficulties. Reducers are mounted directly on the shaft and anchored by fastening to any fixed object. Unit is driven with a V-belt, and special sheaves (Taper-Lock) permit any speed ratio.

Also available is an overload release which loosens the belts, cuts off the power, and gives warning in case of excessive load. A built-in back stop can also be provided for preventing reversal of direction of rotation.—*Dodge Mfg. Co., Mishawaka, Ind.*

Circle 124A on Reader Service Card

Want More Information?

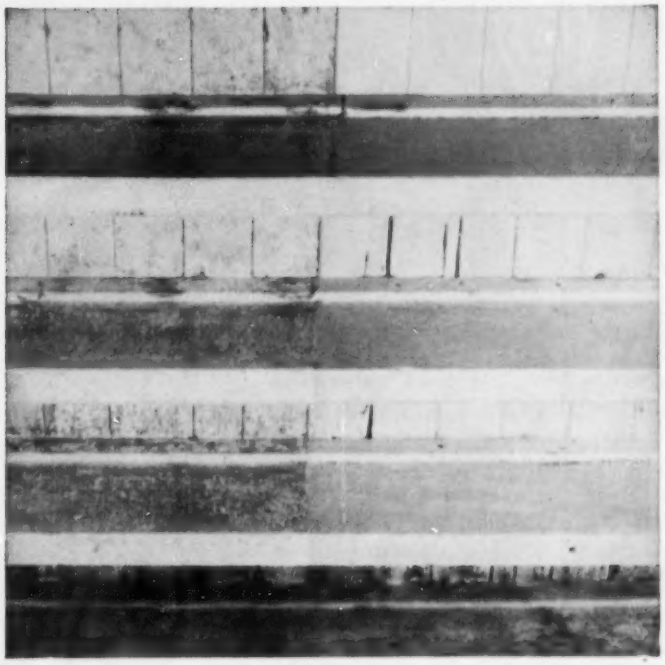
It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service Postcard—back of book. Then sign at the bottom and mail.

For your convenience, items in this department are listed (by page number) in the Reader Service Section.

NEW DU PONT ODORLESS MILDEW-RESISTANT ENAMEL

solves mildew problem in hundreds of food plants

Food-plant managers across the country have found that Du Pont Odorless Mildew-Resistant Enamel Oyster White retards the growth of most types of mildew on walls and ceilings. Formulated with solubilized copper-8-quinolinolate fungicide, Du Pont Mildew-Resistant Enamel is especially suitable for meat-packing plants, poultry and cheese plants, creameries and other areas where mildew presents a major problem. Tests prove that in most types of food processing plants it effectively retards mildew formation for months . . . eliminates the need for constant cleaning and scrubbing. And Du Pont Mildew-Resistant Enamel resists chipping and cracking . . . stays bright-looking month after month. What's more, when you consider the expense of constant cleaning, you'll realize just how economical this superior maintenance finish is. Mail the coupon today for complete information.



Photograph shows section of beamed ceiling in food-processing plant after three years' exposure. Lower strip: cleaned but left unpainted. Upper left: painted with ordinary non-fungicide enamel. Upper right: painted with Du Pont Mildew-Resistant Enamel.

Check these important advantages:

- ✓ **Effectively retards most types of mildew**
- ✓ **Cuts maintenance costs**
- ✓ **Odorless during application**

FREE LITERATURE! Mail coupon today.

E. I. du Pont de Nemours & Co. (Inc.)
Finishes Division, Dept. F-64
Wilmington 98, Delaware

Gentlemen:
Please send me, without obligation, free literature on how to combat mildew.

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BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

PAINTS

Chemically engineered to do the job better

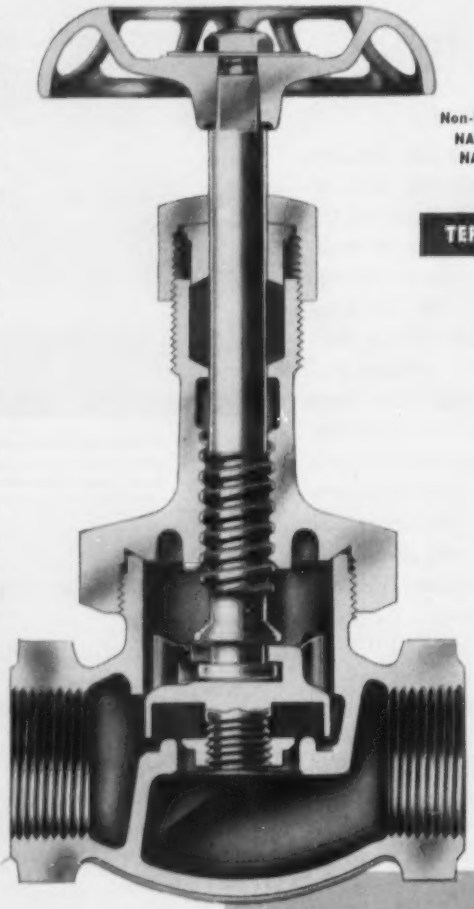
For more data, circle this page number on card at back →

These "Hospital Valves" for **OXYGEN** now serve many industrial needs . . . JENKINS Bronze Globe and Angle with **TEFLON** disc and packing

Jenkins Figs. 504 and 505 Bronze Globe and Angle Hospital Valves were designed for the critical requirements of controlling oxygen, nitrous oxide, or any non-flammable gases in hospital services. Industry was quick to note the unique advantages, and they are frequently specified for systems carrying gaseous fluids for heating, cooling, lighting, and processing, where pressure does not exceed 400 psi, or temperature a maximum of 150° F.

Fitted and tested to comply fully with all Association specifications for hospital services, they have the "extra value" construction throughout that is assured by Jenkins quality standards.

Get details—find out how these valves can improve efficiency and economy in your hookups for critical service. They are another example of the broad range of "valves for every service" in Jenkins' complete line.



Complies fully with "Standards for Non-Flammable Medical Gas Systems" of—
NATIONAL FIRE PROTECTION ASSOCIATION
NATIONAL BOARD OF FIRE UNDERWRITERS
AMERICAN HOSPITAL ASSOCIATION

TEFLON Disc and Packing

DuPont "Teflon" is a tough, "waxy" inert solid, gray-white in color, tasteless and odorless, non-adhesive and frictionless. Teflon's high resilience assures perfect contact of disc with lapped, crowned seat for gastight closure. Packing is one-piece ring of Teflon, provides dependable leak-proof seal with light compression.

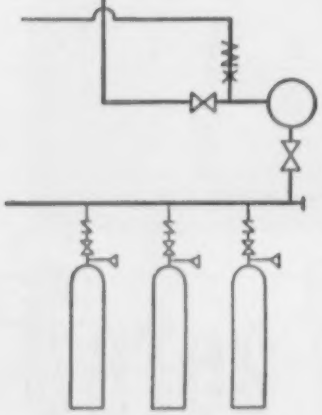
Reinforced Body Casting
High strength bronze body is ribbed along bottom centerline providing extremely high factor of safety. Guards against distortion from vibration, shock, or pipe strains.

Degreased
All bronze parts are thoroughly degreased before assembly.

Polished Spindle
Alloy bronze spindle is polished to permit easy turning and assure leak-proof seal.

Patterns
Globe Fig. 504, Angle Fig. 505

Sizes and Pressure
¼" to 2" 400 lb. O.W.G.



GET COMPLETE INFORMATION from your Jenkins Valve Distributor, or write: Jenkins Bros., 100 Park Ave., New York 17. Ask for Bulletin 116.

JENKINS VALVES

LOOK FOR THE JENKINS DIAMOND

SINCE 1864 TRADE JENKINS MARK

Jenkins Bros

SOLD THROUGH LEADING INDUSTRIAL DISTRIBUTORS EVERYWHERE

Equipment & Supplies

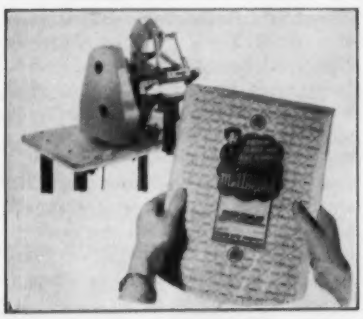
Tachometer-Controller Has Numerous Uses

In addition to indicating speed, this tachometer actuates self-contained power relays that signal overspeeds and underspeeds.

Designated Series 42X, it may be used for sounding alarms, turning on light signals, stopping or starting equipment, opening or closing valves, and controlling speeds. High- and low-limit pointers are independently adjustable and act as a single-pole, double-throw switch with regular speed pointer as the switch center arm. A manual pushbutton resets the unit after relays signal a high or low speed.

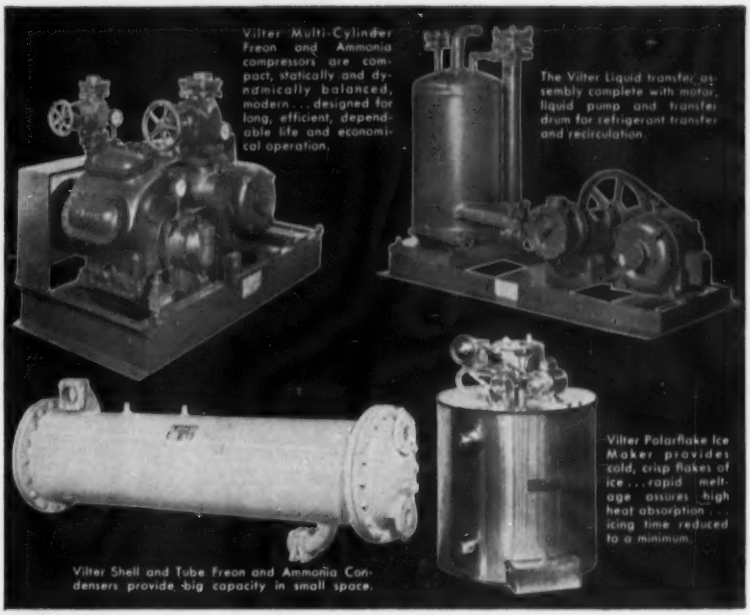
Tachometer is available with any of 48 different rate scales such as rpm., or fpm.—*Metron Instrument Co.*, 432 *Lincoln St., Denver 3, Colo.*

Circle 127A on Reader Service Card



Portable Printer Marks Plastic Bags, as Needed

A flat-surface printer, which permits marking of ingredient or other variable data on plastic bags, is seen eliminating costly inventories of pre-


Vilter Multi-Cylinder Freon and Ammonia compressors are compact, statically and dynamically balanced, modern . . . designed for long, efficient, dependable life and economical operation.
The Vilter Liquid transfer assembly complete with motor, liquid pump and transfer drum for refrigerant transfer and recirculation.
Vilter Polarflake Ice Maker provides cold, crisp flakes of ice . . . rapid meltage assures high heat absorption . . . icing time reduced to a minimum.
Vilter Shell and Tube Freon and Ammonia Condensers provide big capacity in small space.

Q- What is the most modern line of refrigeration equipment for food processing plants-?

A. Vilter refrigeration that

costs less to own*

Now, from one manufacturer, Vilter, you can get a complete line of integrated, fully modern refrigeration equipment engineered to your specific food processing plant needs. Furthermore, by standardizing on Vilter equipment throughout your plant, you gain the benefits of sound engineering design that provides efficient performance and minimum maintenance, precise fabrication that guarantees reliable day-in-day-out service, and careful installation analysis that reduces plant operating expenses. When you buy Vilter you buy performance with built-in economy.

Whether for poultry processing plants, packing houses, dairies, breweries, bottling plants, frozen food processors and cold storage warehouses, among others, Vilter has the size and kind of fully automatic refrigeration equipment you need. From Multi-Cylinder and Vertical compressors that assure minimum power requirements per ton of refrigeration developed to Polarflake Ice Makers, Pakicers, Zer-O-Disc Fin Coils, Shell and Tube Condensers, Liquid Transfer Systems, Supercapacity Water Coolers, Verti-Bay Coils, Latent Heat Storage Systems, and many other units—Vilter can provide the custom designed answer for your refrigeration needs.

Consult with your nearest Vilter representative for a well-planned refrigeration or air conditioning installation.

* Savings in low first cost are not the complete answer when considering the installation of refrigeration equipment. But savings in terms of years of extra service, reliable performance and minimum maintenance—that's where Vilter excels in low-cost ownership.

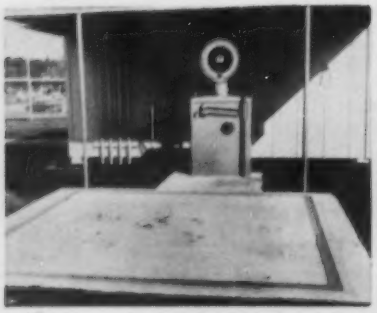
QUALITY CRAFTSMANSHIP that lasts . . .

ENGINEERING DESIGN that guarantees performance

Vilter REFRIGERATION and AIR CONDITIONING

THE VILTER MANUFACTURING COMPANY, Milwaukee 7, Wisconsin

Air Units • Ammonia & Freon Compressors • Booster Compressors • Bandelier Coolers • Water & Brine Coolers • Blast Freezers • Evaporative & Shell & Tube Condensers • Pipe Coils • Valves & Fittings • Pakice & Polarflake Ice Machines



It Pays To Check On New TOLEDO *Hi-Weigh* TRUCK SCALES

Guard against doubtful truck weights that are so costly in money and good will . . . in your dealings with customers, with vendors, with highway enforcement officials. Check the load on *new* TOLEDO Hi-Weigh Truck Scales! Engineered for today's heavy duty needs . . . choice of two-section, four-section or axle load in full range of models. New design means lower installation costs . . . plus long-life Toledo accuracy and durability. All Toledo Hi-Weigh Scales available with Toledo Printweigh for recording weights on tickets, strips, or sheets. Toledo Scale Company, Toledo 1, Ohio.

Send for Literature
Bulletin 2417

NEW ECONOMY IN INSTALLATION . . . These BIG four-section scales are built to weigh the heaviest and largest highway vehicles to meet needs today . . . and tomorrow. Toledo engineering has integrated lever, weighbridge, and pit design to achieve high strength combined with economical, long-life installation.

SERVICE Factory-Trained 200 Cities

TOLEDO®
HEADQUARTERS FOR SCALES

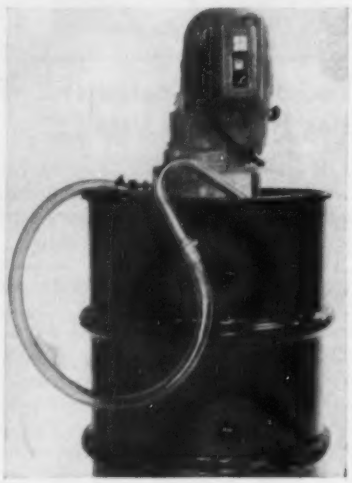
Equipment & Supplies

printed film used in vacuum packaging.

With this unit (Model 45A), the processor imprints data as needed. Further, it permits rapid changing of type inserts or rubber plates. Machine and marking compound are designed for films such as cellulose acetate, Pliofilm, cellophane, and hydracellulose.

The portable unit occupies 13x23 in. of bench space in the production line. Maximum imprint size is 2⅞x 6⅛ in. with type bar or masterplate, 2½x6½ in. with rubber plate.—*Markem Machine Co., Keene 56, N. H.*

Circle 127B on Reader Service Card



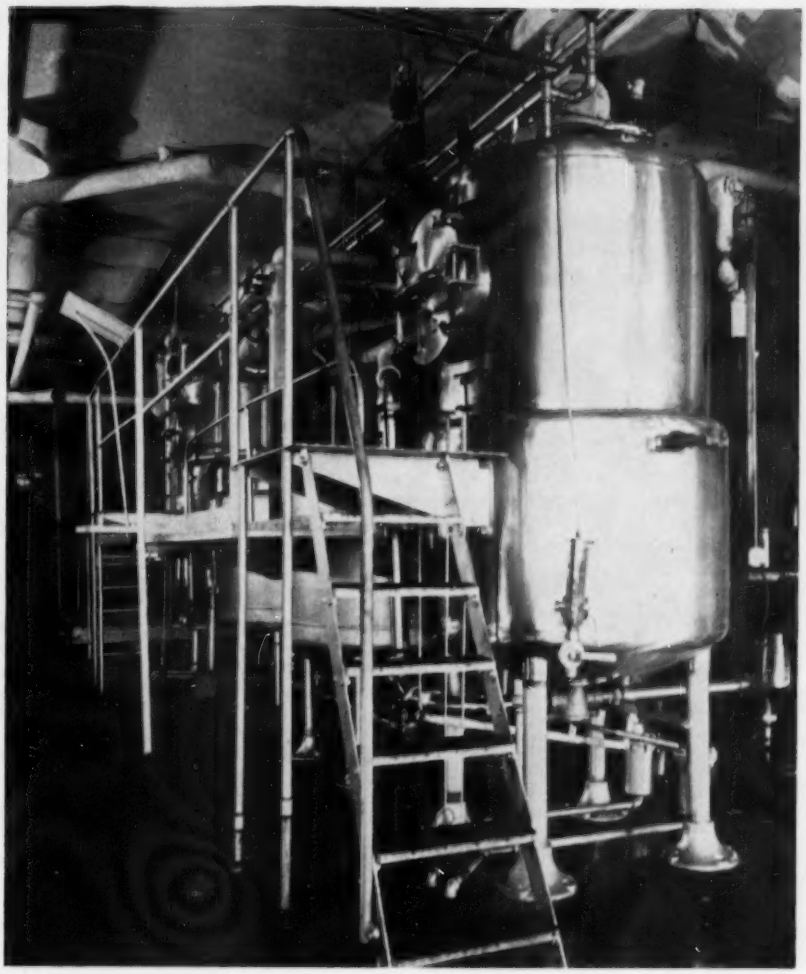
Mechanical Drum Pump Is Sanitary, Efficient

This sanitary drum pump is designed to cut the labor, time, and cost of emptying drums by hand.

Without waste or contamination, heavy-duty electric unit transfers products such as jelly and corn syrup at rates up to 25 lb. per min. Material is pumped quietly in a steady stream. Flow begins immediately with a flick of a starter switch, since priming is not necessary.

Pump is made of stainless steel and aluminum. It is mounted on a lid which covers any 55-gal. open-head steel drum. Also available for use with odd-sized drums. And lid need not be clamped to the drum for efficient operation.

Unit may be operated periodically without cleaning, especially when pump has been used for the same material. But even when different materials are drained, it need only be flushed with hot water after each operation. A convenient indication of when pump needs cleaning is clean-



Besides guarding flavor and color, this Pfaudler vacuum processing equipment is exceptionally easy to operate and clean! Made of shimmering stainless steel, it is used by many of the largest food processors.

Jellies and preserves

How to trap their natural flavor and color

The people who buy your product do three things with it: they look, they spread, they taste.

If they like it, they'll be back. That's why protecting the natural color and flavor of your fruit products is of vital importance to you.

To do this, you enjoy a big advantage when you use Pfaudler vacuum processors. *In fact, for strawberry preserves, vacuum processing is a must.* Concentration is accomplished at lower than the normal boiling temperature. This protects the natural taste of your product, preventing boil-off of flavor and loss of color.

And you also have accurate control of the dispersal of fruit in the preserve. You can easily produce a product with that just-right firmness for easy spreading.

Today is the time to think about these improvements in your product. Just return the coupon and we'll rush detailed information to you by return mail.

THE PFAUDLER CO.
Rochester 3, N. Y.

THE PFAUDLER CO., Dept. FE-4, Rochester 3, N. Y.

BY RETURN MAIL, please rush me full details on Pfaudler Vacuum Processing Equipment.

Name_____

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Company_____

Address_____

City_____ Zone____ State_____

For more data, circle this page number on card at back →

Special Starches

for

frozen foods

What happens to your

starch thickener

between freezing and thawing?

- **Are you troubled with:**
  - lumping or cheesy texture
  - poor reconstitution with added liquids
  - masked flavor
  - clouded color?
- **Looking for a starch that will be unaffected by:**
  - time and temperature changes
  - other ingredients
  - processing methods
  - variances in equipment?

National is in a position to help you—with a variety of special starches to meet the individual needs of your foods from soup to dessert. Our food technologists will be happy to work with you. Write or telephone for samples and data.

National
STARCH PRODUCTS INC.

270 Madison Avenue, New York 16 • 3641 So. Washtenaw Avenue, Chicago 32 • 735 Battery Street, San Francisco 11

liness of the transparent, flexible hose through which product is transferred. It hooks over the lip of receiving container with a stainless-steel, goose-neck fitting.

Also available are similar pumps for handling light liquids at rates up to 20 lb. per min.—*Mallet & Co., 601 E. General Robinson St., Pittsburgh 12.*

Circle 127B on Reader Service Card

High Production Reported For Meat-Chopper Line

Powered by 7½, 15, and 25-hp. motors, this new line of heavy-duty meat choppers is designed to produce from 2,760 to 11,000 lb. of chopped meat per hr.

Maximum speed and efficiency are offered by unit's cutting-group design and tapered roller-bearing thrust. Flat-sided plates are provided for positive alignment. Bowl and feed screw are tinned for greater sanitation, while the chopper is finished in silver hammertone.

Large-capacity stainless pans with mounting brackets are optionally available.—*Toledo Scale Co., Toledo 1, Ohio.*

Circle 131A on Reader Service Card

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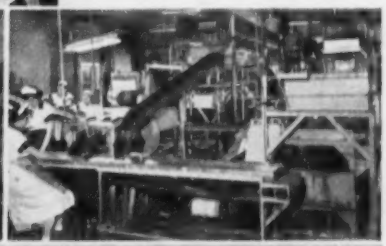


Production at Kennett Canning Co. starts with the Robins-built cutting table, to first inspection. Then, up the elevator to grading and washing, thence to the Thermotic Steam Blanchers (designed to minimize weight loss) and final inspection preparatory to canning.

"OUR *Robins* ENGINEERED PROCESSING LINE... ...is a major factor in making this business of canning mushrooms possible, practical and profitable" says Mr. Edward J. Sharpless, *President* Kennett Canning Company

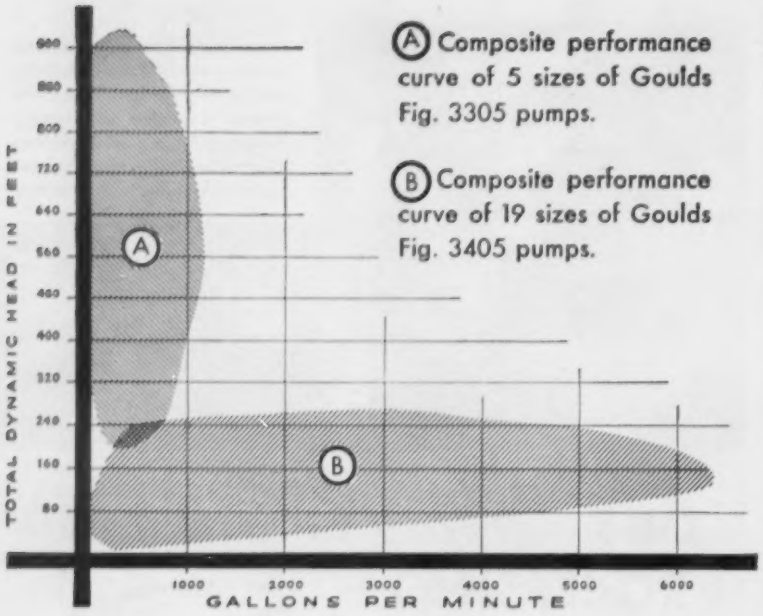
Three big problems faced the mushroom canning industry in its infancy. Mushrooms had to be handled delicately while in process; production-line methods were badly needed in order to reduce labor costs; loss of weight during processing had to be reduced; a high degree of sanitation was necessary.

Working with mushroom canners, Robins engineers designed processing machinery that overcame the handling, loss of weight and sanitation problems. Then, in establishments like Kennett Canning Co., Robins incorporated these machines into fast-moving production and inspection lines that permit millions of American housewives to purchase delectable canned mushrooms at budget prices.

Robins equipment, Robins experience, and Robins engineering ability will be helpful to you if you have a processing problem or if you want more economical, automatic movement while processing. Consult the Robins representative in your area or write direct.

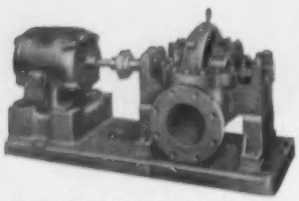
A.K.Robins AND COMPANY, INC.

713-729 East Lombard Street • Baltimore 2, Md.
Manufacturers of Food Processing Machinery Since 1855
Do you have a Robins Catalog? May we send you one?

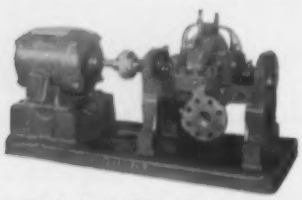


Do you need pumping capacity?

. . . or head? . . . or both?



Goulds Fig. 3405 single-stage pump.



Goulds Fig. 3305 two-stage pump.

With these two groups of Goulds centrifugal pumps you can meet an extremely wide range of pumping requirements.

For volume pumping, 19 sizes of the Fig. 3405 single-stage, double-suction pump provide capacities up to 6,400 GPM, and heads to 280 ft.

For greater pressure requirements 5 sizes of the Fig. 3305 two-stage pump provide heads up to 1,000 ft., and capacities to 1,200 GPM.

Both of these groups of pumps have important new design and construction features that insure efficient operation and long life. Yet, because so many of their parts are interchangeable, *you can cut your parts inventory in two—or better.*

For example, you need only 3 different shafts for all 24 sizes of pumps in both groups.

We'd like to send you additional details about these pumps, including specifications and performance curves. Just write for Bulletin 721.6 about the Fig. 3405 single-stage pumps, and Bulletin 722.6 about the Fig. 3305 two-stage pumps. We'll be glad to send you copies of both.

MEMBER

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Equipment & Supplies

Analyzes for Moisture Quickly, Accurately

Moisture content of any food may be easily and accurately determined with use of this meter using the infrared principle.

Unit (Aladin II) can be operated by a non-technical person after brief instruction. To get a reading he plugs it in, places a sample on the test tray, and flips a switch. Percentage of moisture soon appears on the dial.

Weighing of samples on a separate balance is not necessary, and no conversion charts or temperature corrections need be used. Instrument range is ½—99% moisture, and is available complete with accessories.—*Klock, Inc., 385 E. Green St., Pasadena, Calif.*

Circle 132A on Reader Service Card

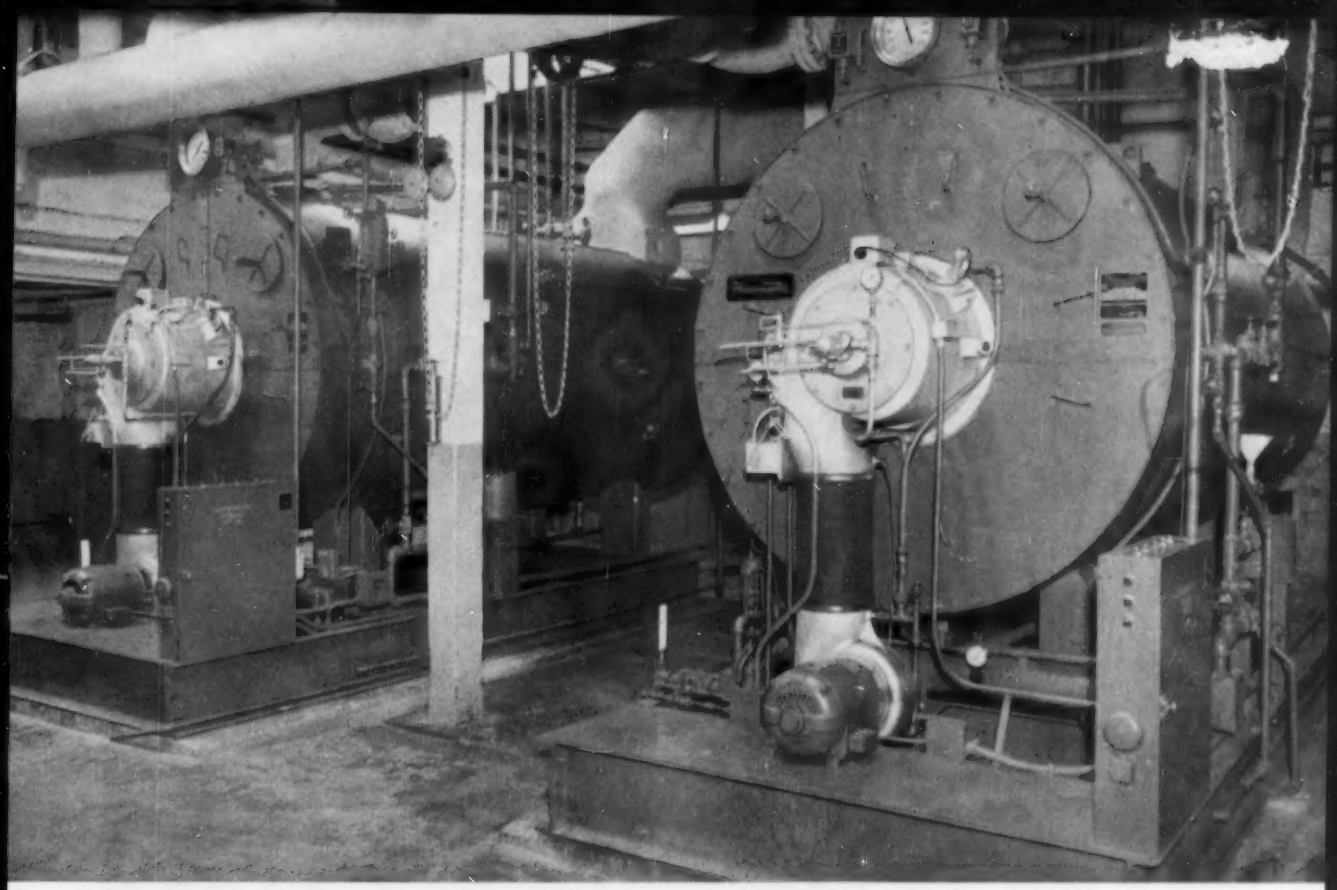
Checkweigher Rejects Short-Count Cartons

Designed for brewery operation, this continuous-motion checkweigher automatically rejects incompletely filled cartons or loose cans as they come down the packing line.

Called High-Speed (S-12), unit handles 50 cartons per min. of a dozen 12-oz. cans. On smaller packs such as the six, 12-oz. cans, or six, 16-oz. cans, capacity is up to 75 cartons per min.

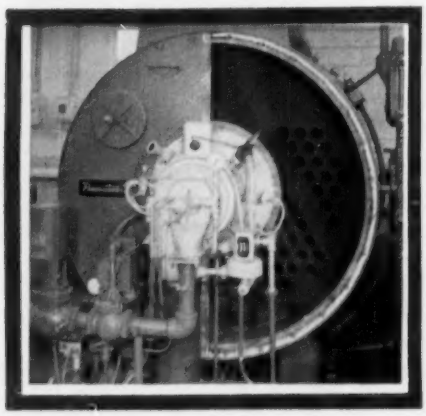
Machine, equipped with feeding conveyors, can be supplied for a single-line or duplex installations. It operates on 110v., 60 cycle a.c., and 50 psi. of compressed air.—*High-Speed Checkweigher Co., 605 W. State St., Ithaca, N. Y.*

Circle 132B on Reader Service Card



WHY TWO?

Powermaster® PACKAGED AUTOMATIC BOILERS



Time-saving inspection and cleaning of *Powermaster* is provided by easy removal of sectioned front cover without disturbing burner, accessory equipment or piping; by convenient handholes; and by easily removable rear cover. This simple and complete accessibility is a big advantage in maintaining clean, efficient operation over the entire life of *Powermaster* units.

● Major operating advantages are gained by installing two or more *Powermasters* rather than a single large boiler. These include greater assurance of a constant steam supply, increased flexibility of operation, more efficient light load standby, reserve capacity for extra-heavy load demands and for rapid expansion, greater freedom from downtime for inspection and maintenance.

Sizable cost economies also are effected because of *Powermaster's* simplified installation, space-saving compactness, automatic time-saving operation, fast steaming and quick response to load swings, high fuel economy at all loads, maintenance-saving accessibility and other service-proved features.

These are reasons why multiple *Powermaster* installations are now serving numerous manufacturing industries, institutions, public buildings, schools, housing projects, laundries, military posts and other steam users.

Be sure you take a close look at *Powermaster* advantages whenever you're looking for a dependable, low-cost steam supply for any plant or building requirement. Ask for Bulletin 1220.

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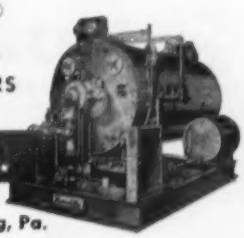
Sizes to 500 hp.; pressures to 250 psi



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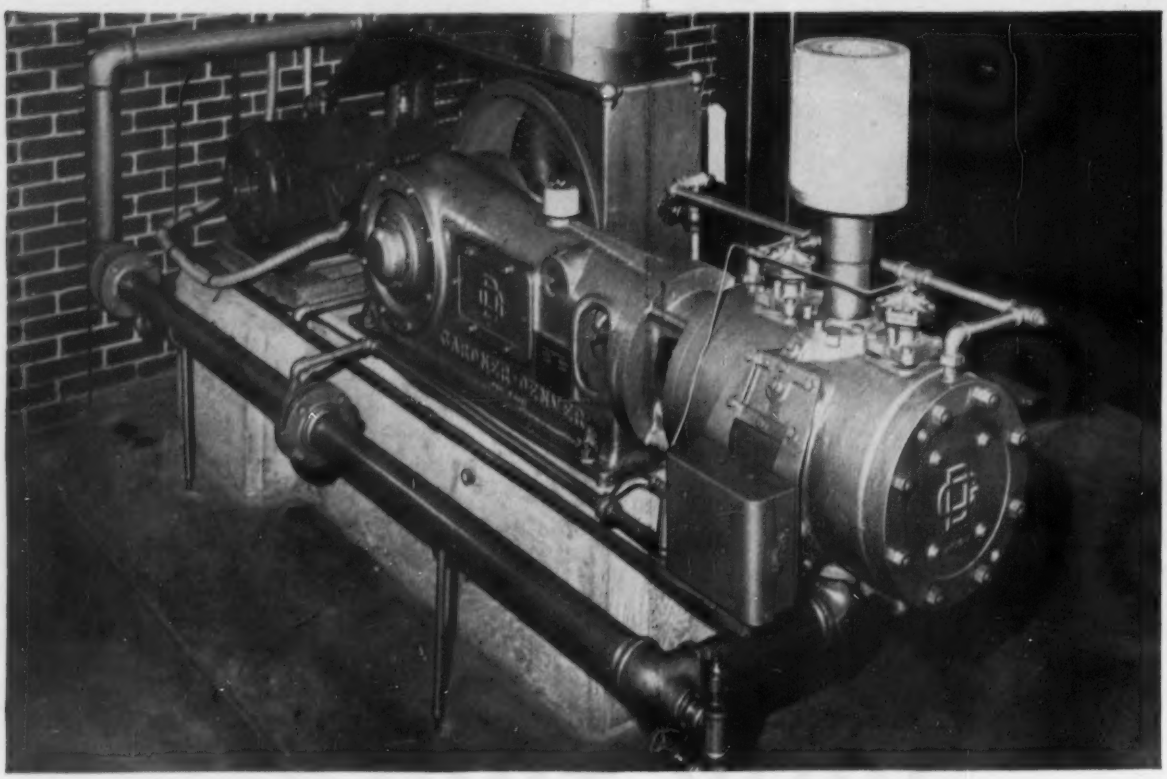
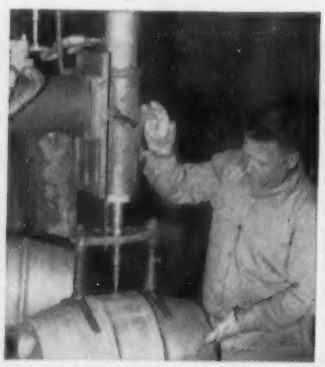


Oil-Free air with no maintenance penalty . . . Gardner-Denver Carbon Piston Compressors

Pure, oil-free air that's safe for textiles, plastics, foods, beverages, automation instruments. Low-cost air that's economical for maintenance tools and regular plant operation.

You get *both* from the Gardner-Denver CRX Carbon Piston Compressor.

Self-lubricating carbon, used for pistons and other parts, does away with any need for oil in the cylinder. Yet, user reports show that cost per cubic foot of air compressed by the CRX matches usual compressed air costs. There's no maintenance penalty—no need for two separate compressed air systems in your plant. Send for Bulletin CRC-10 today.



A Tip For Breweries
With this set-up, one man can remove beer barrel bungs at the rate of 400 per hour. It's done with a poppet controlled Keller Tool "Airfeedrill".® Write for details.

GARDNER - DENVER

THE QUALITY LEADER IN COMPRESSORS, PUMPS, ROCK DRILLS AND AIR TOOLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

New Chemicals

Process-Water Additive Curbs Rusting of Cans

A new water-conditioning agent offers canners safe, low-cost means for protecting processed cans against rust during prolonged storage.

Further, it may permit substantial savings by enabling use of cans with thinner tin coating.

The compound (Stil-Brite), which is in powder form, is added either to processing or cooling water. It cuts the water's corrosivity and covers the cans with a protective film that renders them immune to rusting. This film is invisible to the naked eye and harmless to the consumer.

Amount of compound needed for adequate protection depends upon the water's chemical analysis. For open-top cookers or conventional cooling canals, 1 lb. per 1,000 gal. usually suffices. However, highly corrosive water may require up to 1¾ lb.

Material is easily handled without special apparatus and occasions no extra processing or cooling of cans. Correct water concentration is readily maintained by a simple comparator which can be operated by non-technical personnel. It not only shows any concentration deficiency, but indicates amount of compound needed to bring the water back to standard.

Of great interest to the processor is the ability of this material to preserve the original shining appearance of cans processed in boiling water. Factory tests with extra-thin-coated cans thus processed for 25-35 min. in open-top cookers show darkening to a dull finish. However, when compound was added cans retained their original gloss.

Experiments further indicate that 1 lb. of compound permits 4 hr. operation in an average-size, vertical open-top retort.—*Brant Chemical Co., Brantford, Ont., Canada.*

Circle 135A on Reader Service Card

Powdered Hand Cleaner Has Bactericidal Action

A new hand cleaner, designed to remove grease and heavy soils while protecting against skin infection, is said to reduce skin bacteria by 97%.

Product is a powder compounded of detergents, soaps, fine abrasive and bacteriostat. It is mildly alkaline (pH below 10) and washes away easily without clogging drains.—*Oakite Products, Inc., 19 Rector St., N. Y. C.*

Circle 135B on Reader Service Card

meat processors:
Order Cuts or Moulds to YOUR Specifications!
BONED TO YOUR SPECIFICATIONS!
MOULDED TO YOUR SPECIFICATIONS!
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WE'LL SHIP IN ANY QUANTITY!

Now meat processors can order cuts to their own specifications — fresh or frozen. Our refrigerated trucks deliver your special order to your plant ready for further processing and packaging — just as specified. You have no trimmings to dispose of . . . no waste . . . you save capital investment . . . you save time and increase production. Sell all the meat you buy. All this extra special service, plus the controlled quality you specifically order, adds up to savings for you. All meats U. S. Government inspected.

GET IN TOUCH NOW
USE THIS COUPON OR PHONE COLLECT
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NAME OF PLANT_____
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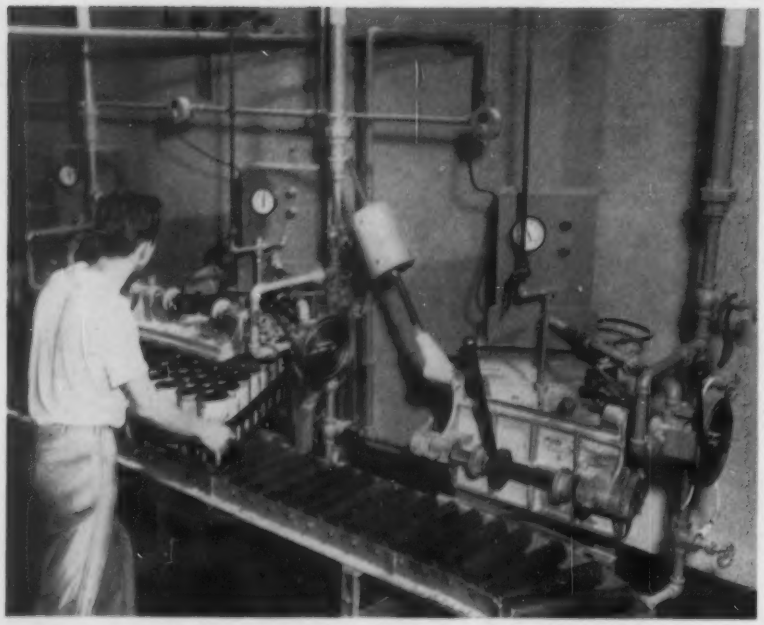
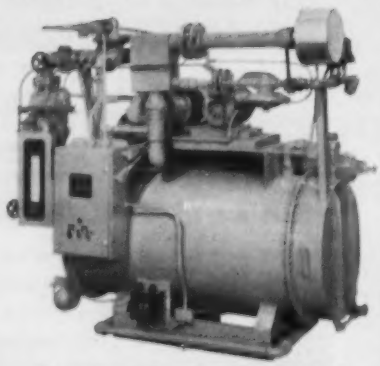


Dry Milk Processor Protects Nutritive Value of Product with Gas Atmospheres System

Maple Island, Inc. protects the nutritive value and taste of their dry milk products for long periods of time through the ingenious system of eliminating oxygen from the product from the moment of its manufacture until the moment of use.

The heart of this operation is an inert gas system that guards against oxygen during the packaging process. To bring their gas cost to an absolute minimum, Maple Island, after a thorough study, selected a 500 cfh Gas Atmospheres Inert Generator with dryers and trace oxygen removal units. The entire system gives them a very dry, high purity gas, and according to Maple Island officials—it has required a minimum of maintenance over a four year period — and had actually paid for itself before it had been in operation a single year. Even though Maple Island has expanded their operations substantially, the original Gas Atmospheres unit gives them the flexibility they require. By running it during the off periods and compressing and storing the excess in tanks for use the next production day, they have not found it necessary to add further equipment.



Gas Atmospheres' XH50—500CFH Inert Atmosphere Generator of the type used by Maple Island to manufacture high purity gas composed of 88% nitrogen and 12% CO_2 completely void of oxygen. It is fully automatic in operation.

9504

gas Atmospheres, inc
equipment for producing industrial gases
20011 WEST LAKE ROAD CLEVELAND 16, OHIO

Briefs . . .

Sanitation-Inspection Kit uses black light and fluorescent materials to detect contamination in foods, rodent infestation, and faulty sewage systems. —*Black Light Corp. of America, San Gabriel, Calif.* (136A)

Vibratory Feeder has magnet and springs totally enclosed to protect motor drive against dust, or spillage from supply hopper. Capacity: 500 tons per hr.—*Syntron Co., Homer City, Pa.* (136B)

Electronic Inspector attaches to bottling line, detects foreign matter in washed glass.—*Brookdale Laboratories, 222 Sylvan Rd., Bloomfield, N. J.* (136C)

Drum Lift, with 750-lb. capacity, employs foot-operated hydraulic jack to handle steel drums (55 and 30 gal.), and fiber drums (18-23 in. dia). —*Sterling, Fleischman Co., Broomall, Pa.* (136D)

Solids-Level Indicator, employing paddle wheel rotated by 10w. motor, may be mounted vertically or horizontally. Available with exposed parts of stainless steel.—*Fuller Co., Catasauqua, Pa.* (136E)

Ribbon-Type Mixers offer six agitator designs—for end or center discharge of mix, for reducing lumps, and for cutting shortening into dry flour. Mixers with capacities of 25 to 450 gal. are available in steel or stainless. —*The Cincinnati Hildebrand Co., 3416 Beekman St., Cincinnati 23, Ohio.* (136F)

Disposable Styrene Petri Dish eliminates cleaning of glass dishes for reuse. Sterile throw-aways, packaged for indefinite storage life, have 90-C. heat-distortion point.—*Chicago Apparatus Co., 1735 N. Ashland Ave., Chicago.* (136G)

Self-Cleaning Tubular Filter uses air pressure, built up at end of filtering cycle, for sudden back-surge that removes the cake.—*Industrial Filter & Pump Mfg. Co., 5916 Ogden Ave., Chicago 50.* (136H)

Air-Filter Cartridge that removes 99.95% of 0.3-micron-dia. particles reportedly offsets higher initial cost with 2-3 yr. service life.—*Flanders Mill, Riverhead, L. I., N. Y.* (136I)

Fruit-Box Labeler applies end labels in semi-automatic operation.—*A. F. Wiggins, 413 Townshend St., Hastings, New Zealand.* (136J)

FOR DEPENDABILITY

...for consistent product protection
YOU CAN DEPEND UPON J&L STEEL CONTAINERS

Through years of dependable service, J&L Steel Drums and Pails have proved that they meet the most rigid tests for product protection. You can be certain that the product quality your customers expect is thoroughly protected because:

1. J&L Drums and Pails are made from high quality J&L Steel Sheet.
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You can obtain J&L Steel Drums and Pails through plants located in leading industrial centers. You'll find J&L service fast and efficient. Call the J&L office serving your community.

The J&L line includes all types of Closures and Finishes. Bright, colorful decorations may be reproduced to your specifications. Heavy-duty ICC Drums. Light-gauge Drums. 55, 30 and 15 gal. capacity and 100-lb. Grease Drums. Lightweight Drums for Chemical and Powdered Materials. 1-10 gal. capacity Steel Pails for Foods, Chemicals, Oils.

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There's **MORE** rating selection available in Allis-Chalmers **MOTORS**

To meet industry needs...

Allis-Chalmers Offers Complete Line of Rib-Type MOTORS from 1 to 100 Hp

Allis-Chalmers, a pioneer in rib-type TEFC motor design, is the only leading manufacturer offering a complete line of these motors from 1 to 100 hp. The many cost-saving features of deep-rib construction can be applied in a variety of uses... both indoors and out.

Here's why these motors can cut your costs:

MORE cooling surface — Rib-type design provides reserve cooling capacity in dirty locations.

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MORE copper — Allis-Chalmers greater use of copper increases electrical life.

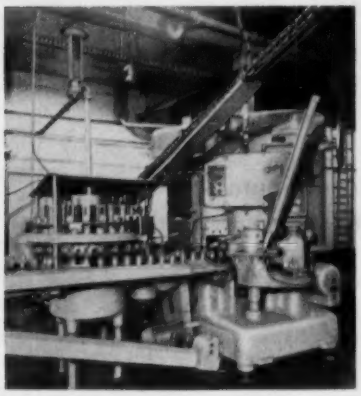
MORE lubrication provisions — Large grease reservoirs surround bearings. Provision made for in-service relubrication — important where moisture or corrosive vapors contaminate grease.

As a new machinery component or as replacement, specify Allis-Chalmers. To find out more, contact your nearby Allis-Chalmers distributor, district office, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

A-4936

ALLIS-CHALMERS

Equipment Applications



Double Seamer Closes 1,000 Cans/Min.

Six-ounce cans of frozen orange-juice concentrate are being closed at rates up to 1,000 per min. at the Florida plant of Minute Maid Co. This machine is also being used for carbonated beverages at Pabst Brewing Co., Milwaukee.

The high-speed unit (Model 210-8R, American Can Co., 100 Park Ave., New York City) is a self-contained, can-revolve closing machine for double-seaming of round cans. It has eight seaming units in a revolving cage, and can be adapted for steam- or gas-flow closure.

Reportedly readily arranged for close hook-up to most fillers, this machine offers smooth can transfer and easily removed change parts. Latter permit closing of cans ranging from 202 to 211 in dia. and 200 to 508 in height. Machine weighs 9,100 lb., and occupies 49x57 in. of floor space.

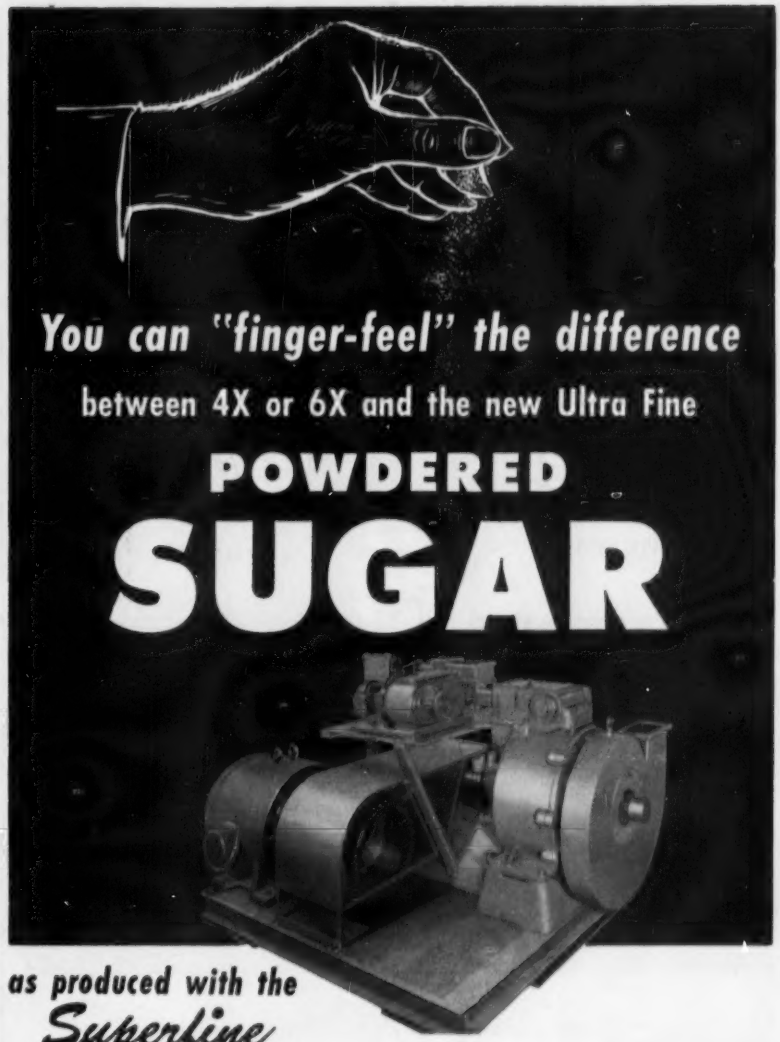
Maker also offers similar model (410-6R2) for closing round cans at up to 600 per min. Can sizes: 202 to 404 in dia., 108 to 708 in height.

Circle 139A on Reader Service Card

Efficient Label Removal Cuts Use of Caustic

Installation of a single-end bottle washer with special label remover is expected to save up to 16 barrels of alkali a year at Canada Dry Bottling Co., Kingston, Ontario, Canada.

Major portion of this saving is attributed to the machine's label-removal system, said to be 99.9% effective. Removed labels are deposited in easily emptied drawers, where they cannot fall back into and contaminate the soaking solution. Therefore, the


You can "finger-feel" the difference
between 4X or 6X and the new Ultra Fine
POWDERED
SUGAR
as produced with the
Superfine
SCHUTZ-O'NEILL PULVERIZER
THE NEW, FINER GROUND POWDERED SUGAR introduced in recent months has been received with great interest. Products containing powdered sugar can be up-graded with the new ultra fine sucrose. The advantages of this new grade of powdered sugar are: smoother, creamier textures—elimination of coarse, gritty particles—faster dissolving—and easier blending.
SCHUTZ-O'NEILL IS PROUD to have their SUPERFINE Pulverizer in use for the production of this new powdered sugar. This pulverizer will deliver powders to almost any desired degree of fineness, and is manufactured in six sizes using 7½ to 125 H.P. motors to meet most production requirements.
POWDERED SUGAR IS BUT ONE of the many food products manufactured with this machine. Cocoa powder, vegetable gums, Irish moss extracts, specialty grain flours, spices, and various dairy products, such as cheese whey, can be pulverized with the Schutz-O'Neill SUPERFINE. Write us for detailed information.
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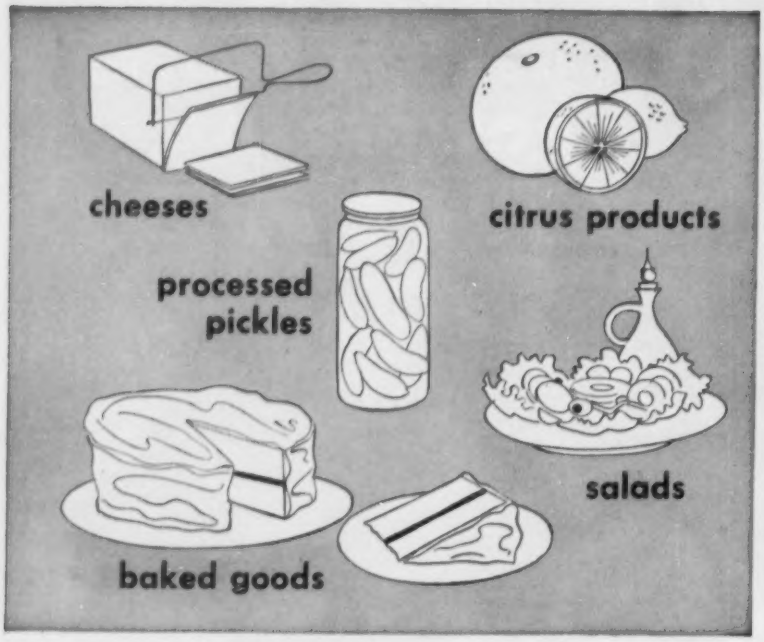
*a **NEW** selective food fungistat for...*



- Sorbic can be used with confidence at required levels—it is metabolized like fatty acids in foods.
- Sorbic controls growth of many undesirable microorganisms in foods.
- Sorbic can be so used that it permits the growth of many of the desirable organisms.
- Sorbic contributes no flavor at required concentrations in foods so far tested.

For further information write the CARBIDE office nearest you for technical bulletin F-6568. In Canada: Carbide Chemicals Company, Division of Union Carbide Canada Limited, Montreal and Toronto.

* CARBIDE'S *refined sorbic acid for use in foods.*

CARBIDE and CARBON CHEMICALS COMPANY
A Division of
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30 East 42nd Street UCC New York 17, N. Y.

Equipment Applications

caustic solution need be changed less often.

The eight-wide washer (Red Circle, Model KHQ, Cherry-Burrell Corp., 427 W. Randolph St., Chicago) handles quarts, pints, and splits. Also available are 6- and 12-wide models.

Circle 139B on Reader Service Card

Aluminum Anodes Curb Pasteurizer Corrosion

Cathodic protection is keeping Vortex beer pasteurizers free of corrosion at Oertel Brewing Co., Louisville, Ky.

The system (Harco Corp., 16915 Broadway, Cleveland) employs a four-circuit rectifier and aluminum electrodes to eliminate the galvanic effect, which is most pronounced in the hot-water tanks. Electrodes, located for minimum current consumption, are replaced about once a year during routine downtime.

Circle 140A on Reader Service Card

Bread Crumbs Dried At 2,000 Lb./Hr.

A rotary dryer with cellular sections is being used to reduce moisture content of bread crumbs from 35% to 5% without disintegration. Production is 2,000 lb. per hr. at Pepperidge Farms, Inc., Downer's Grove, Ill.

Honeycomb design of the unit (Standard Steel Corp., 5001 S. Boyle Ave., Los Angeles 58) prevents the diced cubes from falling too far. Also, compartments are arranged to give the product greater drying time before it is air-conveyed to the discharge bin.

Circle 140B on Reader Service Card

Packaging Costs Cut By Versatile Filler

Accurate metering of olive oil into jars later to be filled with mushrooms was a four-girl operation now being handled by one girl at De Vincente & Co., Kennecut Sq., Pa.

The 75% reduction in labor costs is credited to use of a newly designed filler (Simplex, F. L. Burt Co., 571 Seventh St., San Francisco) that handles 30 containers per min, metering 1¾ oz. to as little as ¾ oz.. Unit also fills semi-solids and is rapidly disassembled for cleaning.

Circle 140C on Reader Service Card

This is TASTE EXCITEMENT!

Stops the shopper

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...and pulls

...and sells!

it can sell more frozen foods for you!

Taste Excitement is one of three basic elements that makes up a sales-boosting, scientific package design. When properly compounded, these design factors blend into a package that pours irresistible pressure on shoppers—pressure that can mean increased sales volume for you.

But modern package design is a science. To achieve a frozen food wrapper that stands out and sells against all competition requires highly specialized knowledge and experience. Western Waxed Paper Division offers you this sales-proved package design service.

Increased Sales...
by Design!

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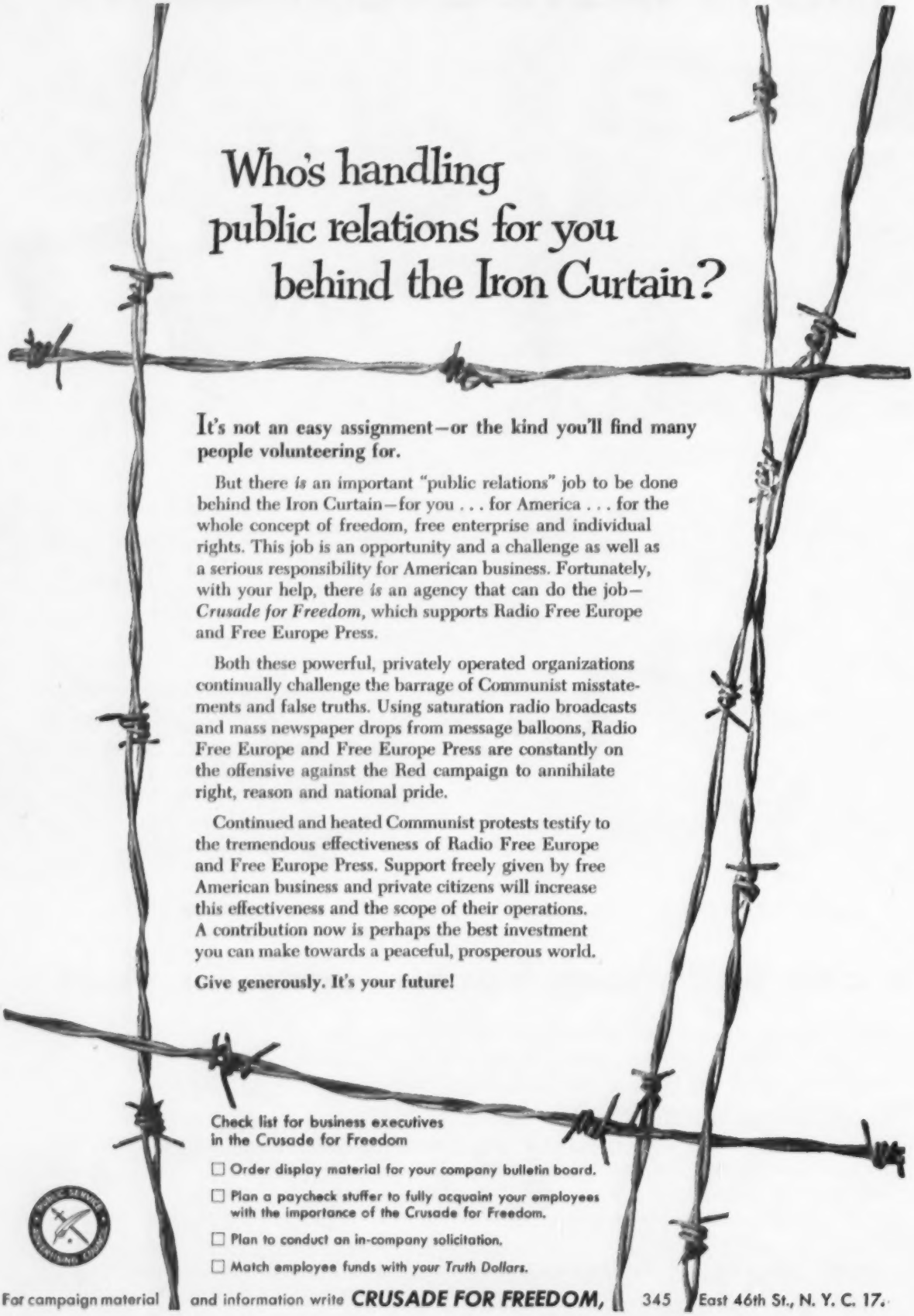

Who's handling public relations for you behind the Iron Curtain?

It's not an easy assignment—or the kind you'll find many people volunteering for.

But there *is* an important "public relations" job to be done behind the Iron Curtain—for you . . . for America . . . for the whole concept of freedom, free enterprise and individual rights. This job is an opportunity and a challenge as well as a serious responsibility for American business. Fortunately, with your help, there *is* an agency that can do the job—*Crusade for Freedom*, which supports Radio Free Europe and Free Europe Press.

Both these powerful, privately operated organizations continually challenge the barrage of Communist misstatements and false truths. Using saturation radio broadcasts and mass newspaper drops from message balloons, Radio Free Europe and Free Europe Press are constantly on the offensive against the Red campaign to annihilate right, reason and national pride.

Continued and heated Communist protests testify to the tremendous effectiveness of Radio Free Europe and Free Europe Press. Support freely given by free American business and private citizens will increase this effectiveness and the scope of their operations. A contribution now is perhaps the best investment you can make towards a peaceful, prosperous world.

Give generously. It's your future!

Check list for business executives in the Crusade for Freedom

- ☐ Order display material for your company bulletin board.
- ☐ Plan a paycheck stuffer to fully acquaint your employees with the importance of the Crusade for Freedom.
- ☐ Plan to conduct an in-company solicitation.
- ☐ Match employee funds with *your Truth Dollars.*

For campaign material and information write **CRUSADE FOR FREEDOM,** 345 East 46th St., N. Y. C. 17.

Canned-Cherry Redness

—Continued from page 53

ance for 6 months and longer, and were still attractive after a year's storage. At this low temperature, chemical reactions are slowed and destruction of red pigment is minimized.

▶ Moreover, limited taste-panel tests indicated that low-temperature storage inhibits the deterioration in flavor that normally occurs at 75F.

▶ And the graph showns another important point: Loss in redness associated with storing fresh, unbruised cherries is insignificant compared with that in storing the canned product.

True, storing of the fresh cherries in air at 35F. for 3 weeks caused some loss of red pigment. This is shown by comparison of the starting points of (B) and (C) on the graph. However, this loss was less than that occurring in the canned product during storage for only 1 month at 75F. In fact, temperature of storage affected redness more than did relative freshness of the raw fruit.

Note that tree-fresh cherries processed at once (B) and then stored at 75F. for 1 month were just about as red as those held for 3 weeks before processing (C) and stored for 1 month at 35F. after processing. Similar results have been obtained for other samples, too.

We do not, of course, recommend holding of harvested cherries for 3 weeks, or even 3 days before processing. Commercially handled fruit would spoil as a result of such delay and, as the graph shows, a holding period has some deleterious effect on color of unbruised cherries as well.

This experiment was included merely to provide a yardstick for measusing relative seriousness of color loss.

End (Resume reading on page 54)

New Bread Process

—Continued from page 83

business continues. And here depreciated net assets should be approximately ½ of the annual sales. Thus, $100,000 in net fixed assets, which are the result of normal depreciation, should reflect a business doing $600,000 yearly in sales.

Pointers on Coatings

In discussing hard butter coatings, Justin Alikonis, of The Al-Chem Laboratories, Inc., Bloomington, Ill., pointed out that the key to good gloss retention is the way the coatings are conditioned, tempered, and used.

Formerly, they were tempered by slow cooling to a mushy stage, and then heated to proper coating temperature. Now, more progressive outfits are seeding them with properly prepared seed and use of continuous feed. Here, high-speed coating machines are fed the conditioned coating at the same rate it is applied to the bakery goods.

Challenging Products

Un-iced finished cakes are a "natural" from a production standpoint, since they by-pass the icing station. And they should enable a baker to increase varieties and improve sales. So reported J. F. Hook, of Lever Brothers, Ltd., Toronto.

Further, he said that more complaints are received on bakers' iced, rather than un-iced, cakes. And 48% of the consumers surveyed in Toronto preferred to buy the un-iced.

He emphasized application of the do-it-yourself technique to meet the challenge of prepared, packaged cake mixes, along with instant frostings. Suggested and illustrated were such eye-appealing items as:

1. Baked un-iced round cake, orange butter cream icing, and orange chiffon filling—packed in separate paper cups, and all three cellophane-overwrapped on a circular cardboard disk.

2. Ten cup cakes, container of icing, birthday candles—all cello-wrapped and bow-ribbon tied.

3. Two cakes, plastic squeeze tubes of icings, plastic container of glazed cherries—packed in aluminum TV tray and cello-wrapped.

4. Heat-'n'-serve puddings (8 portions), and cup of caramel sauce—in cello-wrapped aluminum tray.

5. Toast-a-muffin (8 muffins), with maple butter (2 cup portions)—packed in foil tray.

Proposed was a line of frozen iced cakes to be sold in retail-store frozen-display cabinets. In telling of them, R. L. Short, Swift & Co., Union, N. J., accented quality ingredients.

Advantage he cited for new line was a reduction in sales and distribution costs. Store deliveries, he said, could be cut to one or two a week.

Key to Quality

Batter-temperature control is a key to quality cake baking, according to Frank Seelinger, of Procter & Gamble Co., Cambridge, Mass. Reasons are its good influences on cake volume, grain, and texture, also mixing time.

Using 50, 70, and 85 F. temperatures, he showed how controlling batter temperature at 70 F. gives best results. Cake volume is highest and mixing time is reduced. Also, desired grain and texture are obtained.

End (Resume reading on page 84)

we follow tried-and-true recipes too...

for VICTOR BELTING

Exact measures of the best materials—careful processing techniques—they're as much a part of making Victor Belting as they are of making your food products.

To make sure that we're following the *right* recipes, our research department keeps careful, continual checks on *everything* that goes into Victor Belting and *every purpose* for which it's used. That's why—with complete confidence—we recommend for *your* food handling:

VICTOR SUPRENE ... special-woven cotton duck belting thoroughly impregnated with exclusive Neoprene compound. Waterproof, highly resistant to grease and most food chemicals, smooth-surfaced, and easily cleaned.

VICTOR 475 ... highest quality solid-woven cotton belting impregnated and coated with a special Neoprene compound. Developed for use where laboratory cleanliness is a *must*. Washable with hot water or steam. Resists rancidity and deterioration.

For food handling the modern sanitary way select from—

A COMPLETE LINE including:
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Question . . .

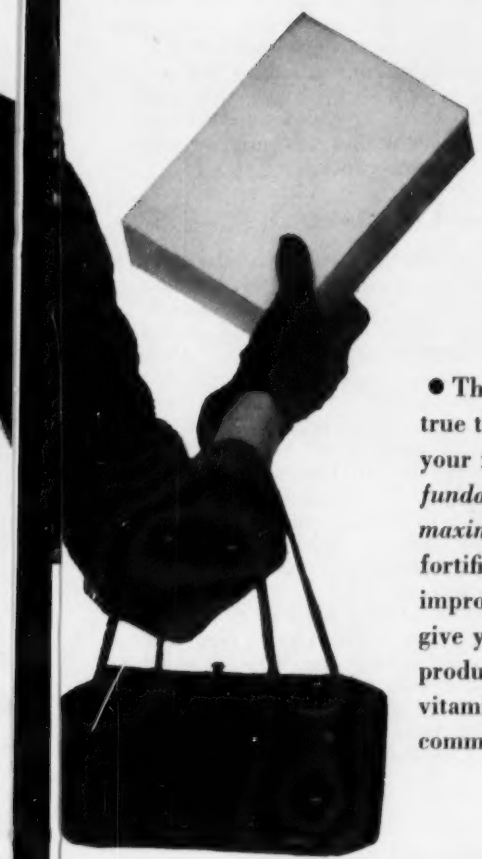
Three of the many groups of foods and beverages that are increasing sales with Pfizer vitamin fortification and enrichment:

● You can give carbonated beverages health appeal for just a fraction of a cent per bottle. That's all Pfizer vitamin-fortification costs. Bottlers are already using Vitamins B_1 and C to boost sales to today's vitamin-conscious public. Vitamin B_{12}, a factor in child growth, is also being considered.

● It's a smart sales move to enrich flour, macaroni, corn meal and similar products with Pfizer BI-CAP® enrichment concentrates. They give such products more food value. Let Pfizer show you how BI-CAP can add sales appeal to your product.

● To fortify your sales position in the canned juice, concentrate and fruit "ade" market, fortify these products with Pfizer vitamins. "Vitamin Fortified" on your label is a strong sales inducement. What's more, your vitamin content is standardized to offset processing losses and seasonal variations.

What's the most powerful appeal to the food shopper?



Answer . . . Her family's health!

Here's how to put it in and on your package.

● There's something very basic about the grocery business that's so simple and true that it's often overlooked. More vital to the *permanent sales position* of your food product than all the temporary give-away promotions is *the fundamental desire of every homemaker to provide her family with the maximum in health-giving nourishment.* That's why Pfizer's vitamin fortification and enrichment program fits in so well with any contemplated improvements in your product. Your Pfizer sales representative is prepared to give you full details on how Pfizer vitamins can powerfully increase your product's sales potential. Remember that Pfizer has been a major vitamin research and production center since the first vitamin was commercially produced.

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Pappadums and bombay-duck

Lemon curd and jam

Japanese king crab meat

Dessert portion control

Norwegian flatbrod

Imported Specialties Spotlighted At International Food Show

Visitors to the recent International Food Show in New York were treated to what might have been their first view of such exotic foods as pappadums, bombay-duck, mandarin oranges, and passion fruit juice.

The pappadums and bombay-duck were exhibited by the Javia-India Condiment Co., New York.

Packed in 6-oz. tins, the pappadums are spiced wafers. A popular Indian dish, they are made from black pea flour, salt, spices, and sesame oil. Toasted or deep-fried, they provide a tasty cocktail or relish biscuit.

The bombay-duck is not duck at all but dried fish of the sardine species. Hand-rolled into 6-in. strips, fish is packed in a square tin. Similar to kippers, the product is toasted or deep-fried to prepare.

Norwegian flatbrod and Scottish oat cakes were on view at the Monte Carlo Foods booth.

The flatbrod, or "flat bread" is made of rye, barley, wheat, water, salt, and yeast. The paper-thin slices have a strong dietetic appeal. A wax-overwrapped carton holds 24 slices. Label is in both English and Norwegian.

Oat cakes are packed in circular biscuit tins, tall fiber cylinders, or merely paper-overwrapped. Two types are marketed: extra special and afternoon tea.

The same New York importer displayed Abernethy biscuits, a light, slightly sugared biscuit similar to shortbread. These are packed in flat tins or overwrapped with waxed paper.

Also at the Monte Carlo booth were lemon curd and a rhubarb and preserved ginger jam. The curd is made from butter, eggs, sugar, and lemons. No filler is used. It may be used as a spread or filling.

Import From Ireland

Another imported marmalade was seen at the Adolph Goldmark & Sons exhibit. Orange marmalade, made by Irish Preserves, Ltd., Dublin, is packed in a 1-lb. jar with a flanged cap. Made of seville oranges with sugar, it is a recent import.

Mynor brand passion fruit nectar was displayed by Susan's Pantry. Packed in tall bottles that contain 1 pt., 10 oz., the nectar makes 1 gal. of tasty beverage when mixed with four parts of water or soda. The nectar may also be used as a filling or topping.

Canned king crabmeat from Japan was shown by Frazar & Co., New York. Packed in 6½-oz. cans with salt added, the meat is graded as fancy, meaning that its content is 65% claw and 35% body.

Chip-Puffs were a highlight of the

Colored popcorn, passion fruit nectar, and Irish marmalade

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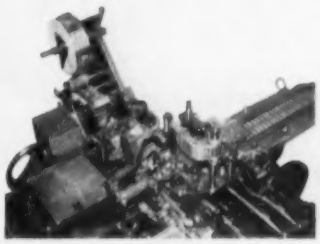

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"WE'VE FOUND THIS LUBRICANT BEST FOR FISH PROCESSING MACHINERY"

says HIGH SEAS Tuna Packing Co., Inc. of California

"We have used LUBRIPLATE Lubricants for over 15 years and find they do everything. They keep fish processing machinery from seizing and keep it easy to take apart and reassemble. This is very important in food processing plants. Because LUBRIPLATE Lubricants are so effective, economical and long-lasting, they save us time and money."

Earl Lockhart
Master Mechanic

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE

LUBRIPLATE LUBRICATION

MAKES CARS AND TRUCKS RUN BETTER AND LAST LONGER

LUBRIPLATE H.D.S. MOTOR OIL . . . THE OIL THAT NEEDS NO ADDITIVES

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK" . . . a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

CHINESE products are Chip-Puffs, bamboo shoots and pickled water chestnuts

SCOTTISH imports include oat cakes and Abermethy biscuits

Cathay Industries display. Made in assorted flavors (onion, shrimp, garlic, etc.) the puffs are dehydrated wafers which swell when deep-fried. Packed in cellophane envelopes in windowed flat cartons, the product is made of tapioca flour, flavoring, potato flour, salt, sugar, vegetable shortening and U. S. certified food color.

Bi-Lingual Label

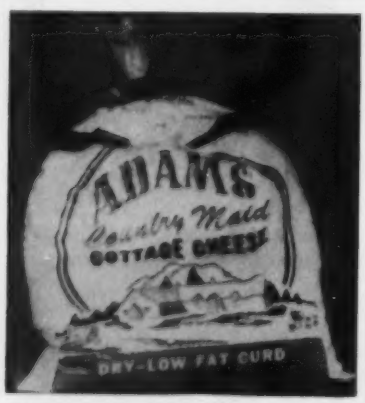
Two other Cathay imports attracted attention: Bamboo shoots from Formosa are in a 20-oz. can with both an English and a Chinese label. The shoots are packed in water. Pickled water chestnuts are packed in a 10-oz. glass jar. Ideal for hors d'oeuvres or salads, the chestnuts.

Seggerman Nixon Corp. displayed Col-R-Corn, varicolored corn kernels for popping. Made by Col-R-Corn Co., Wall Lake, Iowa, the corn is dyed with certified pure food coloring. A glass jar contains 10-oz. of the product.

The same company also exhibited Perrier Sparkling Water. Popular in France for many years, the water is packaged in a graceful green bottle with two band-labels. The sparkling water is colorless and tasteless.

Portion control for ice cream was demonstrated in Gold Seal Farms' Handee-pak. Five individually packaged portions of ice cream are packed in a sleeve and overwrapped.

Each portion contains 3.2 fl. oz. of ice cream.



Cheese in Poly' Bags

Creamed or dry cottage cheese is now packaged in a 16-oz. film bag. Manufactured of Bakelite polyethylene resin, bag is reported to cost about half as much as the conventional 12-oz. carton.

The bags retain moisture and withstand refrigeration, and may be tightly reclosed for storage by twisting the top.

Adams Dairy Co., Blue Springs, Mo., is using the bags. Dry cottage cheese (low fat curd) is poured from measured scoops through a funnel into the bags. Filled bags are closed with pressure sensitive tape. A twist-type tie may also be used.

Circle 148A on Reader Service Card

Continental Cookie Line

Pepperidge Farms, Inc., has introduced a line of quality cookies with emphasis on the "Continental" appeal. Packaged in attractive cartons designed by Jim Nash Associates, New York, the cookies are made of unbleached flour, fresh eggs, 93 score butter, vanilla, and chocolate.

Six varieties are made: Biarritz, a thin circular cookie coated on one side with chocolate; Dresden, a thin almond-flavored cookie; Bordeaux, a butterscotch flavored cookie; Venice, a biscuit brushed with granulated sugar; Capri, a finger-shaped cookie with chocolate dipped ends.

An assortment is packed in the Monte Carlo box.

"That's family packaging!"

Skillful printing design
makes your H&D corrugated shipper
an attractive mate for your primary
package. Family resemblance builds
brand identity. Need some
suggestions? Call on H&D.

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Two Milk Shake Mixes Make Their Debut

Recently introduced are two new powdered milk shake mixes.

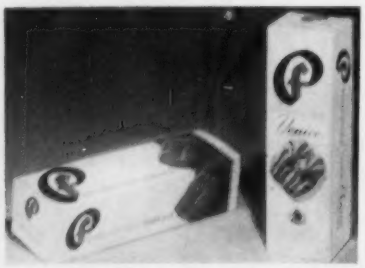
Kool-Shake, processed by Perkins Products Co., Chicago, is made in chocolate, vanilla, and strawberry. Each envelope of the powder makes two tall glasses of milk shake when combined with sugar and a pint of milk.

Hasty Shake is a 10-sec. mix made by Milk Distributors Research Laboratories, Erlanger, Kentucky. Packaged in glass jars, under the Dixie Dew label, it is available in chocolate and strawberry. Two tablespoons of the mix are shaken with half pint of cold milk to make a milk shake.

Food Winners in Folding Box Competition

Colorful Printing, Unique Construction Mark Top Entries at 1956 Folding Carton Competition

DISPLAY CARTON for Spice Islands Co.'s herb shelf copped First Award. Carton is by Fleishhacker Paper Box Co. (150A)



TOP LITHOGRAPHY netted Pepperridge Farm's cookie cartons First Award. Maker is Lord Baltimore Press. (150B)

FAMILY IDENTIFICATION of New England Confectionery Co.'s line rated First Award. Box maker is National Folding Box Co. (150C)

BAKED GOODS carton got a First Award for Stop & Shop Bakery. Manufacturer is Morris Paper Mill (150D)

Highlights Among Merit Awards

UNUSUAL CONSTRUCTION features make these two merit award winners interesting to processors. New Haven Board and Carton Co.'s carrier (left) for cone-top pop cans provides full view of Canada Dry labels (150E). One piece construction of Rochester Folding Box Co.'s mushroom box (right) for Dawn Fresh mushrooms, gives rigidity, high display value. (150F)

Circle Key Numbers on Reader Service Card

Home Soda Fountain

Marketed in seven flavors by C. C. Lang & Son, Baltimore, is a beverage concentrate packaged in pressure cans. Each can makes about 18 7-oz. glasses of beverage when mixed with water or soda. Flavors are orange, grape, lemon-lime, cola, root beer, strawberry, and black cherry.

The 16-oz. can, dome-topped and colorfully lithographed, was developed by American Can Co.

Circle 151A on Reader Service Card

Banana Flavored Bar

Klein's Dairy Products, Cullman, Ala., is distributing a chocolate coated Banana Bar. Slightly thicker than a standard ice cream bar, its center is flavored and shaped like a banana. Manufacture is a two-mold process. The center is frozen and then placed in the vanilla cream mold. The coloring is thus kept separate from the cream.

Distribution is in northern Alabama.

New Product Shorts

Individual Servings of instant coffee are being marketed by Albert Ehler, Fleetwood and Boscul.

Low-Calorie Cheese-milk product called Les-Cal is available in ten Eastern markets. Made of cheddar cheese and nonfat milk solids, is made in 2-lb. loaf.

Shrinkable Film called Snug-Pak is newest Tee-Pak product. High moisture retention and ability to shrink to a skin-tight covering are advantages.

Here's how Hamilton Foods, Inc., of Chicago, automatically overwraps their frozen shrimp.

● A recent survey, made by one of the industry's largest national publications, revealed that Frozen Food Manufacturers use Hayssen Wrapping Machines by a margin of 2 to 1 over the nearest other make, and 4 to 1 over the next two. This overwhelming preference for Hayssen explains why it has become the standard of the industry. The Hayssen is completely automatic from the feed-in of the product to the ejection of the neatly, tightly overwrapped package ready for shipment. The Hayssen will wrap any size package in paper, film or foil, directly from roll stock with heat or glue seal. Let our packaging engineers help you with your packaging problems. WRITE US TODAY for further information.

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First in Automatic Packaging, Since 1910

Albany • Atlanta • Boston • Chicago • Dallas • Denver • Detroit • Los Angeles • Minneapolis
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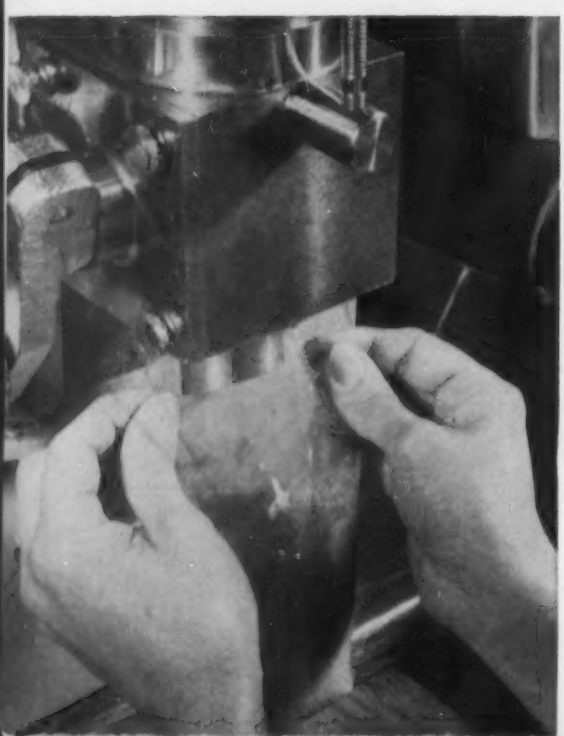
"Polyethylene is ideal for packaging a liquid food

that is packed piping hot and sold ice cold"



"Moreover, the polyethylene film retains our fresh-frozen clam chowder without affecting the taste or purity," asserts James L. Richards, II, president, Vineyard Island Products, Inc., Martha's Vineyard, Mass. "It makes it easy for the housewife to prepare and serve, too.

"The heat-sealed polyethylene package," points out Mr. Richards, "protects against 'freezer burn,' and saves us money on each package."

These are but a few of the reasons why economical film made of BAKELITE Brand Polyethylene can solve *your* food packaging problems. See your packaging supplier for *all* the details, or for our free "Processed Foods" booklet, write Dept. MX-63.

Polyethylene film packaging supplied by **Pierson Associates**, Boston, Mass., and produced by **Deerfield Plastics Company, Inc.**, South Deerfield, Mass.

"Our quick mix stays fresh and dry"

in handy pouches
inner-coated with polyethylene

"An inside extrusion coating of polyethylene puts this inert material right next to the contents. It protects the purity of flavor, keeps moisture definitely out, and provides a dependable heat seal," explains Mr. W. T. Troutman, president of Tromar Corp., Mt. Vernon, Ohio.

Coating or film form, packaging materials made from BAKELITE Brand Polyethylene resins have tremendous advantages to impart to the marketing of liquids, powders and perishables of just about every kind. Ask your packaging supplier for complete information about new packaging developments with BAKELITE Polyethylene. Or write Department MW-63 for our "1956 Guide to Improved Packaging."

Polyethylene-foil-glassine pouches for Tromar Corp. are made by **Shellmar-Betner Flexible Packaging Division of Continental Can Co.**, Mt. Vernon, Ohio.

BAKELITE
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Polyethylene Plastic

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Road to Bad Sanitation

—*Continued from page 45*

actually no one of these tools, just in itself, is a panacea.

Rather each of these various methods contributes a part to the overall requirement in sanitation control.

▶ And even with a good combination of such practices, management must take an active personal role in the sanitation program if it is to be made effective.

As for insects and rodents—prime causes of food contamination and, accordingly, regulatory criticism—management will be much too narrow if it places complete responsibility on the periodic visits of exterminators. For it is the height of *complacency* to believe that the situation is thus fully solved.

To brief this specific approach, there are simply too many other pest problems over which a visiting exterminator has no control. And if management doesn't attend to those other problems they will eventually build up into serious difficulties.

Specific insecticides, and techniques of applying them, have proved very effective. But the plant manager should not consider them as sure methods of killing *all* insects, for some infestations can't be controlled that way.

Killed for the Year?

The general fumigation of the whole plant, carried out, say, once a year, has also made many executives *complacent*. More than a few get the attitude that "all insects and rodents have now been killed for the year, so we have no further problem."

But with even the best general fumigation there is difficulty in achieving a 100% kill. And even if it is achieved, a plant can gradually—or sometimes even rapidly—become re-infested following the treatment, so that long before the next fumigation a troublesome situation has developed.

Still another factor in *complacency* is found in excessive dependence upon a single man. Maybe that man is the plant sanitarian. Of course, the more skilful he is the better. No argument there. But if the "one responsible man" is only seemingly qualified and does not actually carry out a good program, then stormy waters lie ahead.

There are dangers, too, when the plant manager, in a sincere effort to effect thorough cleanliness, makes more than adequate funds and equipment available to his supervisory staff. This manager may return to his office entirely satisfied that no infestation can gain a hold in the face of the exceptional supply of weapons thus made ready at hand for his men. Yet, this manager's efforts may bog down because he has failed to follow-through personally. Without his leadership, much of the supplies and equipment may go unused. For there may be poor organization of the crews and lack of effective routines.

To the casual observer, a plant often appears to be a model of cleanliness. And here the management executives may calmly walk through feeling proud —and *complacent*—of its appearance.

In reality, however, the plant may be only "surface clean." Actually, a number of such "good looking" layouts have been revealed as insanitary after really persistent inspectors have dismantled units for close looks.

There are still other facets to this problem of management *complacency*. For example, there was one plant that was "writing off" more than $10,000 annually in loss of products that had to be destroyed due to insect infestitation. The company attitude was that this was typical, not abnormal, and that it couldn't be cured.

Buck Passing, Too

Still another situation is found in the company that disregards consumer complaints on infested food packages —repeatedly offering the defense that such troubles only occur at the retail or consumer stages.

There is even the case of the company that spent appreciable sums in advertising how clean its plant was —claiming it to be as spic and span as the housewife's own kitchen. Yet shortly thereafter this same company was up against a serious regulatory prosecution on evidence of a heavy plant infestation by mice.

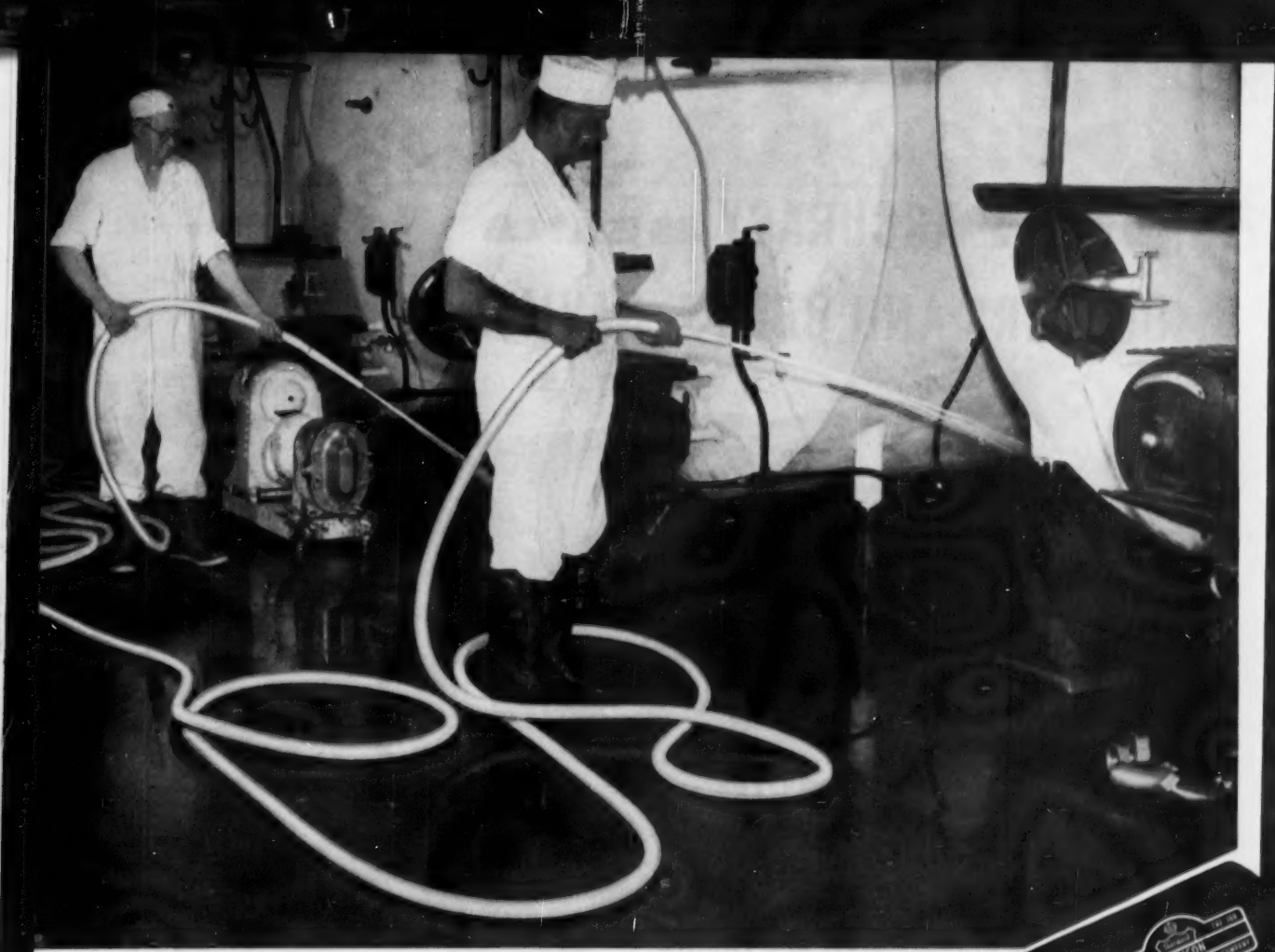
Once they have been prosecuted for insanitary conditions, food plant operators generally become models in assuming an excellent sanitation attitude. They are then no longer *complacent*. And there is little danger that they will ever again be surprised by an outside inspector's discoveries.

▶ Quite obviously, however, preventive sanitation is much more desirable than curative sanitation.

Dangerous *complacency* can be avoided by the encouragement of an open-minded attitude by the people at top management level—through admission of the possibility that "it could happen here."

The way for top executives to determine their plant's true sanitation level is to find out for themselves—without waiting for a regulatory inspector to find out for them.

End (*Resume reading on page 46*)



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ADVANCES IN TECHNOLOGY

Dietetic Ice Cream Cones

Production of edible containers for ice cream, ices, etc., that are not only slowly assimiable in the body, but also retard the assimilation of fat-producing foods is the object of a recent patent.

Crux of the invention is substitution of a high molecular weight dextran for all or a large part of the farinaceous or cereal matter normally employed in making the batter. To this is added powdered sugar and dry milk to impart desired flavor, plasticizers and water to produce moldability.

Batter is poured into conventional molds and baked in the usual manner to produce crisp, rigid containers.—U. S. Patent 2,731,349, Jan. 17, 1956.

Freezing Retards Staling

Bread that has been frozen and stored up to 2 weeks before defrosting becomes firm at a slower rate than unfrozen bread held at the thawing temperature.

Increase in firmness due to freezing and thawing is approximately equal to gain in unfrozen bread during the first 24 hr. of storage. Forty-eight hr. after thawing, however, firmness of frozen bread is approximately identical with that of unfrozen product 48-hr. after baking.

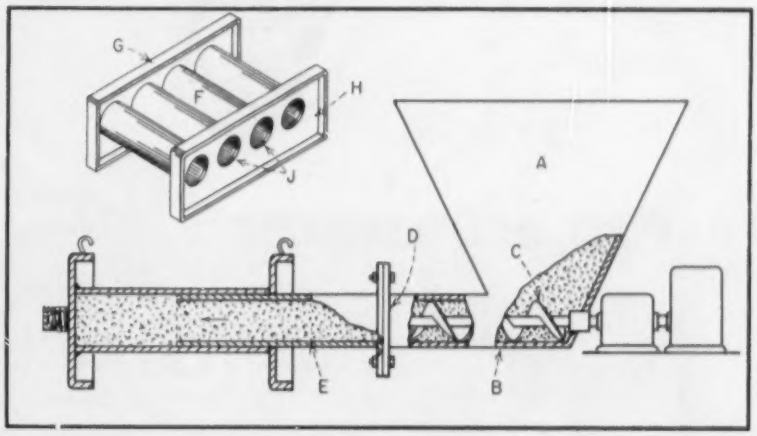
Process must be properly conducted, however. The rapidity with which firmness develops in freshly baked bread emphasizes the importance of freezing as soon and as rapidly as possible after baking.—*Cereal Chemistry*, 519-25, Nov. 1955.

Instant Dry Milk

A process for preparing readily soluble dry milk products with improved keeping qualities has been patented.

The milk product is first concentrated until supersaturated with respect to lactose—50-60% total solids—then passed through a seeding zone where formation of large numbers of very small crystals is induced. This is followed by spray drying to 3% or less moisture.

Lactose in product is said to be partially or wholly in a non-hygroscopic hydrate crystalline form which is relatively stable, non caking and readily soluble.—U. S. Patent 2,728,678, Dec. 27, 1955.



Forms Uniform Chip Steak Rolls

A process and equipment for converting individual meat particles into loaves or rolls for subsequent slicing is the object of a recent patent.

Process comprises introduction of meat adjacent to closed end of cylindrical mold, continuing to feed while axially moving mold away from feed mechanism, stopping feed before meat reaches open end of mold, freezing product in mold, blowing from mold for slicing or other operations.

Feed mechanism comprises vertical hopper (A, drawing above) discharging to horizontal conduit (B) containing helical screw (C) that forces meat to terminal end (D). Intermediate feed tube (E), slightly smaller in diameter than mold, is secured to (D).

Mold (F) comprises one or more cylinders set between parallel back and front plates (G & H). Latter has openings (J) with diameter equal to cylinder bore. Back plate has small opening containing air valve, and is threaded for attaching to compressed air source.

For filling, mold is slipped over intermediate feed tube (E) until discharge end of latter is adjacent to back plate (G). Then worm is started and, as the mold fills, pressure of the meat against back plate forces it away from feed conduit. When mold is almost filled, screw is stopped and another cylinder placed over feed tube.

When all cylinders are filled, mold is removed to freezer and placed in vertical position with open ends up. Cylindrical weights are placed on top of meat cores to insure uniform expansion during freezing.

For removal of frozen core, mold is immersed in warm water to defrost, then end containing air valve is attached to compressed air line. Air is applied and meat roll is forced out open end of mold in a solidified form.—U. S. Patent 2,729,947, Jan. 10, 1956.

Dehydrated Lima Beans

Sulfiting prior to dehydrating is the most important factor in preserving color, flavor and texture of dried lima beans.

Concentration of sulfite in treating solution depends somewhat on length and temperature of storage but should be about 1½%, with solution pH of 7.0-7.2.

Time and temperature of blanching are unimportant as long as peroxidase enzymes are inactivated. Preliminary drying in a through-flow atmospheric unit at high temperature is most economical. This is followed by finish drying at a temperature of 120 F. to 7-5% moisture.

When vacuum packed in plain tin cans a very stable, easily rehydrated product results.—*Food Technology*, 91-95, Feb. 1956.

Frozen Pie Crust Dough

New among the large number of frozen food products now available is a patented frozen pie crust dough.

operation "airmatic" with the

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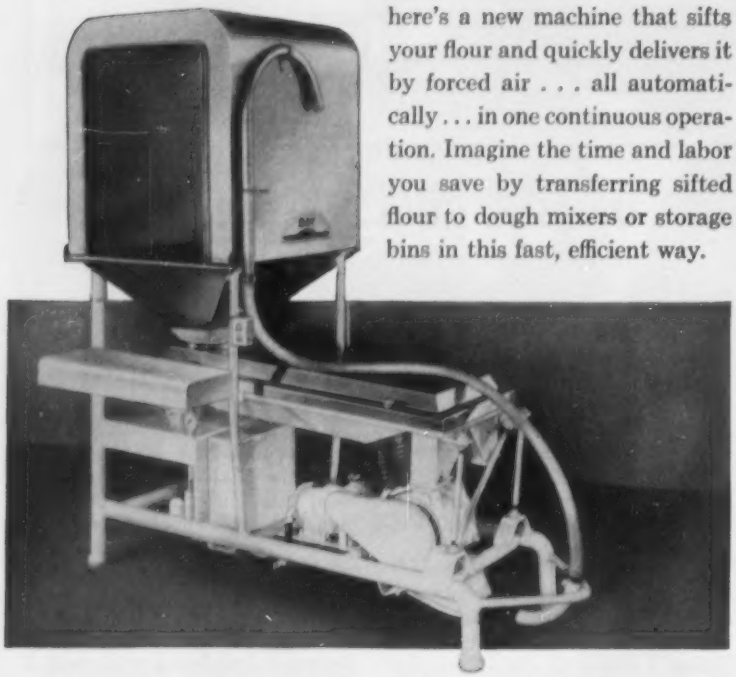

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It is formed in sheets 12x18x$\frac{1}{16}$-in. thick and rolled on a sheet of waxed paper. This is packaged and frozen. To use, it is only necessary to thaw and handle it as though made in the home.

Novelty of dough resides in use of a critical percentage of hard, or winter wheat flour with the usual soft flour. Recipe for a 150-lb batch calls for 63 lb. soft flour, 31.5 lb. hard flour, 39 lb. shortening, 3.75 lb. salt, and 18 lb. water.

The mixture of the two flours is said to yield a dough of superior texture, shortness and taste, with exceptional strength and elasticity.—U. S. Patent 2,726,156, Dec. 6, 1955.

Flavor of Italian Cheeses

Enzyme preparations and bacterial starters used in their manufacture are largely responsible for the flavor of Italian cheeses.

This was determined in a series of studies dealing specifically with identification and measurement of various fatty and amino acids in aged Provolone and Romano cheeses.

Free fatty acid content of 9-month old Provolone cheeses varied in relation to type of enzyme product, and free amino acid content was associated with type of starter organism. Flavors varied from cheddar-like to sharp piquant.

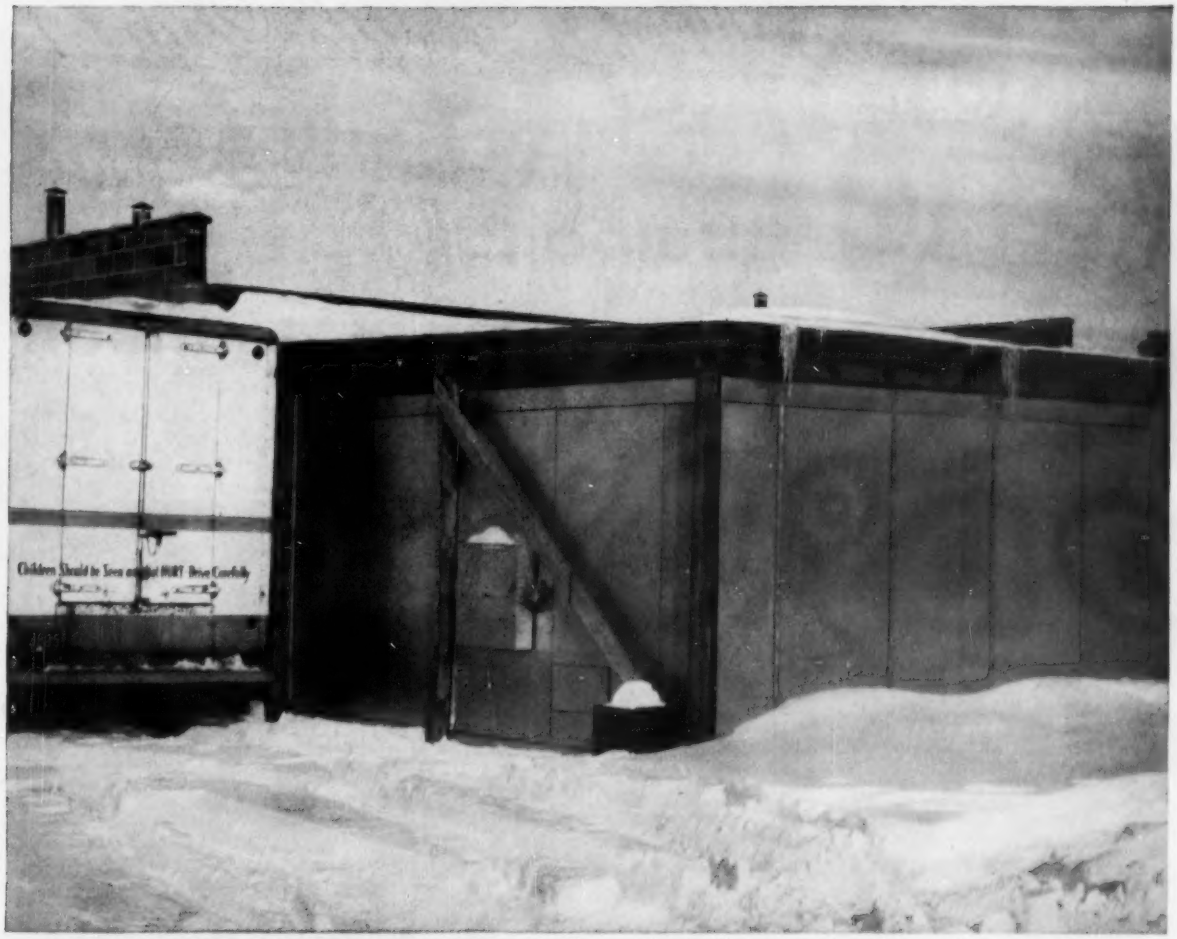
An interrelationship was noted between concentration of free butyric acid and free glutamic acid and desired flavor intensity—about 1 mg. of former to 2 mg. of latter per g. of cheese solids was found in products having characteristic flavor. Concentration of each increased with increase in flavor intensity, but the 1:2 ratio was maintained.

In the case of Romano samples aged 4-26 months, free amino and fatty acid contents were generally higher than in Provolone. Of the former, only glutamic could be related to flavor intensity. Acetic and propionic acids were not associated with either age or flavor intensity, but the higher acids and butyric were related to age and flavor intensity of cheeses of the same age.—*Journal of Dairy Science*. 129-45, Feb. 1956.

Indexes of Beer Quality

Malt modification is a concept not easily defined and not readily measured, but two indexes, the Kolbach and Hartong numbers are frequently used.

The former (percentage of malt nitrogen soluble in mashing process



ARMORPLY FROZEN FOOD STORAGE BOXES are actually a complete building unit in themselves, need no separate outside walls. Boxes shown were built by Freezer Box Division, Annapolis Yacht Yard, Inc., Annapolis, Maryland.

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What is Armorply? It is waterproof plywood with a metal face permanently bonded on either or both sides. Faces include stainless steel, monel, zinc-bond steel, aluminum, lead, copper, and others. Armorply is lightweight, remarkably strong, impervious to moisture, easy to fabricate.

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The new Howard Johnson Food Commissary, Miami, Florida, selected Hamilton Kettles for fast cooking, sanitary design and stainless steel construction.

Chef O. E. Rathfeldt likes the way Hamilton's extra large kettle diameter gives fast cooking, increases production. He also says streamlined, sanitary design makes equipment easy to clean, saves valuable down time, and the stainless steel construction protects against corrosion, guarantees unusually long kettle life.

More and more food commissaries, meat packers, canners and other members of the food processing industry are turning to Hamilton for fine kettles and prompt service. For information on the complete line of Hamilton Kettles, call Paul Hock, GRandview 1-4110 or write.

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for laboratory work) reaches a maximum on the 3d or 4th day of malting, and has been criticized as a modification index for this reason.

The Hartong number combines the results of extract determinations on 4 mashes at different temperatures, and its value increases throughout the malting period.

When a portion of a lot of barley malt was kilned after 5 days of growth, and the remainder after 7 days, former had a Kolbach number of 38.4 indicating a well-modified malt. The 7-day malt had a number of 41.8, a value found for very well modified malts. The Hartong numbers for these malts were 4.8 and 7.1, indicating a scarcely satisfactory and a well-modified malt, respectively.

When brewed and made into beer by the same mashing methods and cellar treatment, there were measurable differences between the two malts. The 7-day malt produced a more highly fermented beer, less full-bodied, and with a less clinging after taste than the 5-day malt beer.

Latter had more real extract and dextrins, and a somewhat better foam and keeping quality biologically, though a greater tendency to chill-haze formation. Its behavior during fermentation was less favorable, a trait observed with other malts of low Hartong number.

The advantage seems to lie with the more mature malts, and a brewer should consider carefully whether the few advantages of 5-day malt make it a worth-while brewing material in view of the improved taste qualities of beer brewed with 7-day malt.—*Brauerei-Rundschau*, 227-31, 1955.

Improved Malt Extract

Novelty is claimed for several aspects of a patented process of preparing malt extract.

First the grain is disintegrated in order to increase surface area, and thereby get better enzymatic action and higher extraction in shorter reaction time. Other advantages are minimum unit labor cost, improved procedure for recovering liquids, and continuous centrifugal separation of solids from liquids.

A thin slurry type mash is prepared from barley malt ground so that 60-90% will pass a 100-mesh screen. Weight ratio of water to solids is three to one. Slurry is heated to 100 F. for about ½ hr. until starch conversion is complete.

Meantime adjunct of rice has been ground and cooked at a temperature of 212 F. and added to the mash. Latter is maintained at the increased

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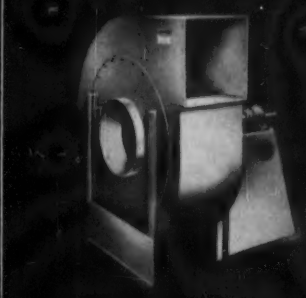

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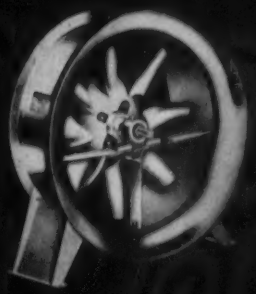

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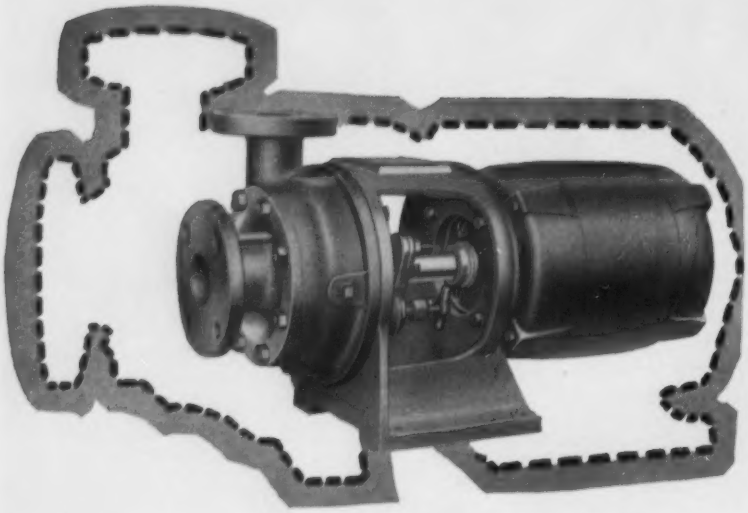

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temperature for about 20 min., after which it is centrifuged. Solids pass to a sparge tank and liquids to a clarifying centrifuge. All solids and sludges ultimately pass to a dryer and all clear liquids to the kettle.—U. S. Patent 2,726,957, Dec. 13, 1955.

Improved Lard Shortening

Directed, as contrasted with random, interesterification of lard has been found successful in overcoming some of the disadvantages of this product as a shortening medium compared with hydrogenated vegetable shortenings.

The method now in commercial use increases the fraction of high-melting solids, trisaturated glycerides, and decreases the fraction of intermediate-melting solids, disaturated glycerides. It is this change in glyceride composition that gives the new properties and advantages as a shortening.

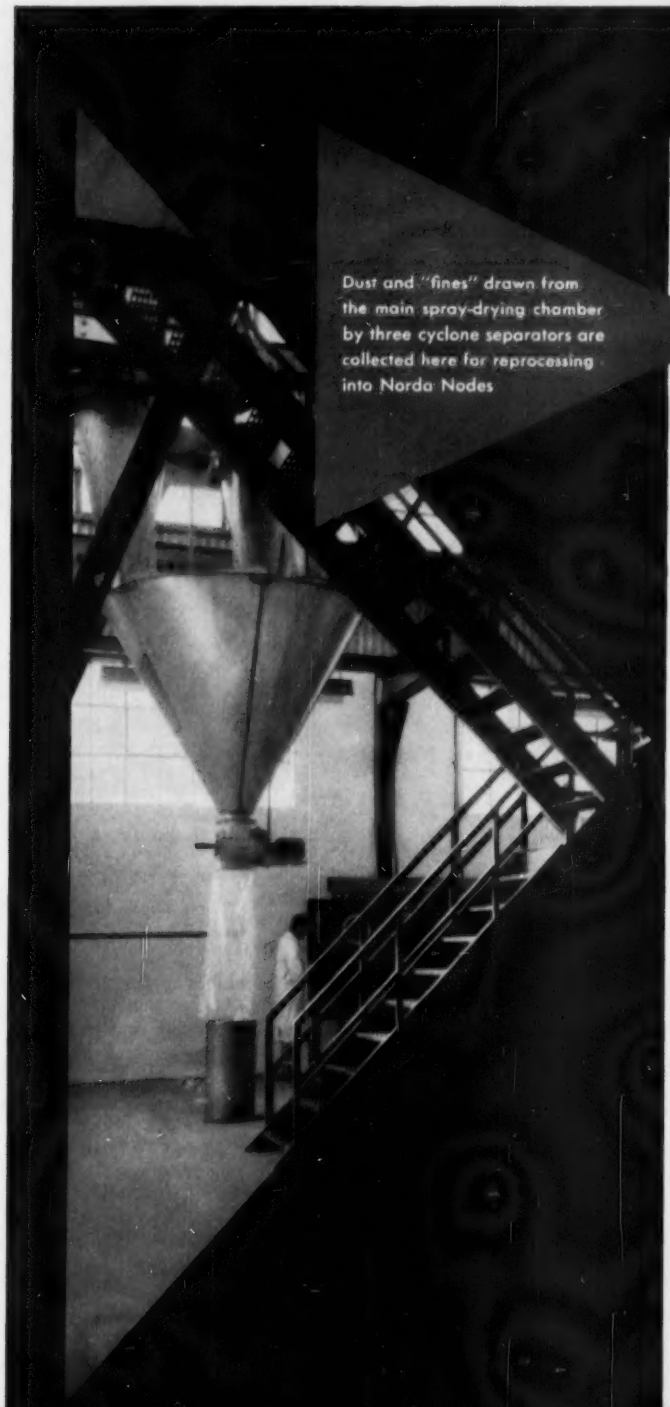
In contrast with natural lard the product has an improved plastic range for any given level of oxidative stability. This means less variation in softness and creaming properties without use of relatively expensive hard-stock. It also means that a uniform product can be prepared from a variable raw material, and a flexibility in operation that makes possible a wider selection of raw materials. Overall performance of the new product is equivalent to that of premium vegetable shortenings.—*Journal of the American Oil Chemists' Society*, 29-35, Jan. 1956.

Artificial Ageing of Coffee

Controlled oxidation is essential feature of a patented process for ageing green coffees so that they may be roasted immediately after harvesting instead of held in stock for months or even years.

Process consists in dehydrating the green beans, oxidizing them by treating with a product capable of delivering nascent oxygen, such as ozone or hydrogen peroxide, then heating to drive off excess oxygen, or leaving them exposed to air for 5 or 6 days to stabilize the ageing. Flavor and taste of treated coffee depend on controlling degree of oxidation and dehydration.

In one suggested method, green coffee is dehydrated by heating with a hot dry gas to a temperature of 100-150 C. Then it is rapidly cooled and transferred to a hermetically sealed rotary churn, into which H_2O_2 is introduced at a concentration of 1.7% by volume and in a proportion



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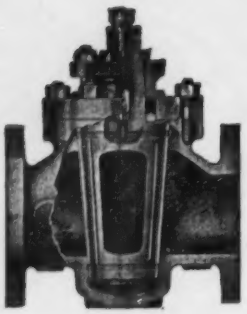

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of 6% of the weight of the coffee. Peroxide is preferably introduced several times during the process, which lasts 1-2 hr.

At end of operation coffee may either be roasted immediately or allowed to stand for 5-6 days. Taste of coffee has then become perfect and disagreeable flavors have disappeared. —U. S. Patent 2,725,299, Nov. 29, 1955.

Trace Factors Responsible For Cloud in Concentrates

That factors other than enzyme activity play important roles in degradation of citrus concentrates was demonstrated in a series of experiments. Purpose was to determine effect of different heat treatments on enzyme inactivation and cloud stability of 42 Brix concentrates made from pineapple and Valencia oranges.

Extracted juices were passed through a finisher equipped with a 0.033 in. screen, then heat-treated and concentrated to 55 Brix in a falling film evaporator. Concentrate was cut back to 42 Brix with unheated single-strength juice.

Heating temperatures ranged from 140-210 F.; times held from 1-120 sec., storage was at 40 F. up to 70 days. Heating to 140 F. for 5 sec. did not appreciably increase stability of product. Heating to 150, 160, and 170 increased stability progressively from 16-23 days. Samples heated to 190 or 210 and held for 5 sec. remained completely stable for the entire test period.

An increase in holding time at 140 and 150 increased stability. But at 160, 170, and 180 holding beyond 15 sec. reduced product stability.

There was comparatively little difference in percent pectinesterase activity between products heated at 150 and 210 F. But there was a marked difference in cloud stability at the higher temperature. This indicates that, although there is a definite relation between enzyme activity and cloud stability, there are other factors involved.—*Food Technology*, 10-16, Jan. 1956.

Pie Filling Machine

Continuous filling of pie shells as they are conveyed into an oven is one of the novel features of a recently patented machine.

Machine comprises a reservoir for pie filling that extends across the front of the oven which is wide enough to receive as many as a dozen pies. A series of spouts extend down-

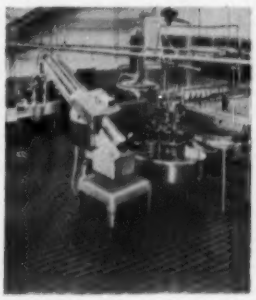
Q. What can you expect of SANI-BRICK FLOORING installed by DREHMANN?

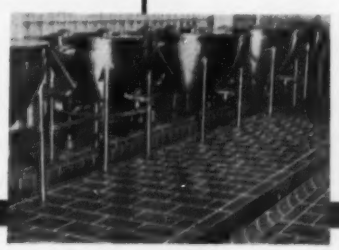
A. TWENTY YEARS and possibly more of high efficiency, low maintenance service.

This is a fact proved beyond doubt by case histories of Drehmann's more than 10,000 installations. Sani-Brick floor laid by Drehmann twenty years and longer ago are still in excellent condition today in spite of punishing treatment.

In food processing—as in many other industries where extreme conditions prevail—Sani-Brick Floors installed by Drehmann have no equal for high sanitary properties, long life and stamina to resist impact, abrasion, constant moisture and corrosives.

If you are planning to build or if your present flooring is showing signs of wear, let a floor-wise Drehmann engineer give you the cost saving facts about Sani-Brick.





Write for Bulletin FI

DREHMANN HAS THE FLOOR FOR MODERN INDUSTRY

DREHMANN — SANI-BRICK FLOORS —

DESIGN
ENGINEERING
INSTALLATION
MAINTENANCE

DREHMANN PAVING & FLOORING CO.
Originator of Brick Floors • Est. 1869
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"See! Only 30 seconds to fog this room!"

THAT's how quickly you can control insects in 10,000 cubic feet of space with WEST ATOMIZERS and VAPOSECTOR insecticide.

Insects have no place to hide. VAPOSECTOR penetrates everywhere:

— cracks

— crevices

— even remote hiding places.

Insects have no time to escape. VAPOSECTOR penetrates their outer skin for a quick, permanent kill. Yet it's safe to use. Odorless. Nontoxic when used as directed.

AND insect control is economical — when VAPOSECTOR is used in a WEST ATOMIZER. Only one or two ounces control all insects in 1,000 cubic feet of space:

— in just 3 seconds

— at a cost as low as 5¢.

LET a West representative tell you more about West's *Insect Control Program*, equipment and insecticides. Many kinds and types are available. Or write for our 32 page booklet, *"Industrial Insect Control."*

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Use your business letterhead to request our 32-page booklet, "Industrial Insect Control."

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ward from the reservoir, suitably spaced to discharge material into a line of pie shells as they are conveyed toward the oven. Each spout has a valve, and all valves are connected to a manually operated lever.

As leading edges of pie shells pass under spouts, valves are opened and allowed to remain open until trailing edges of the shells pass under the spouts.

Operation is manually controlled, insuring uniform filling of shells.—U. S. Patent 2,719,496, Oct. 4, 1955.

Tests for Mildew Resistance

Three accelerated tests are commonly used for determining service life of fungicidal paints, varnishes, and sealers.

The Vickland and Monowitz test uses filter paper coated with the protective agent undergoing test, placed on an agar plate inoculated with *Aspergillus oryzae*.

The Nuodex laboratory test is similar but the mold used is *Pullularia pullulans*, a very common mildew organism.

In the modified Hutchinson test, a fiber-glass string or tape, freed of any carbohydrate sizing, is coated with the test material, dipped into a spore suspension of the test organism, (*Aspergillus niger, A. flavus,* or *Penicillium luteum*) and placed on a plate of mineral salts agar medium.

All of the tests were found to be capable of rating fungicidal paints in order of their effectiveness, and to be confirmable by results of service experience. Latter, however, may be greatly affected by degree of weathering of the coating.

Accelerated tests should extend over 3-4 weeks. Paints containing zinc oxide are more fungus-resistant than those without it. Fungus-resistant vehicles also contribute much to the fungicidal powers of the complete paint.—*Industrial & Eng. Chemistry*, 122-25, 1956.

Influence of O_2 and CO_2 On Stored Grain

In hermetic storage of damp grain, decrease in oxygen and accompanying increase in CO_2 content of bin atmosphere will inhibit mold growth and retard deterioration.

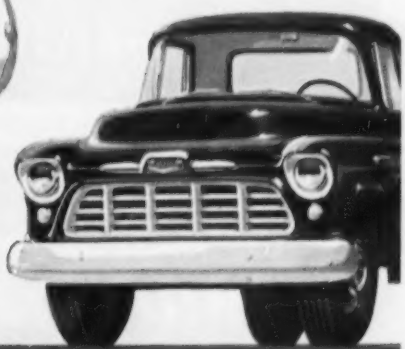
But anaerobic conditions will not prevent fermentation due to yeasts. Therefore, the advisability of storing damp wheat destined for human consumption under such conditions is doubtful.—*Cereal Chemistry*, 53-65, Jan. 1956.

Champs with a new power punch!

These new Task-Force light-duty jobs pack the biggest power punch in Chevrolet truck history with a modern short-stroke V8 and Hydra-Matic Drive for every model!

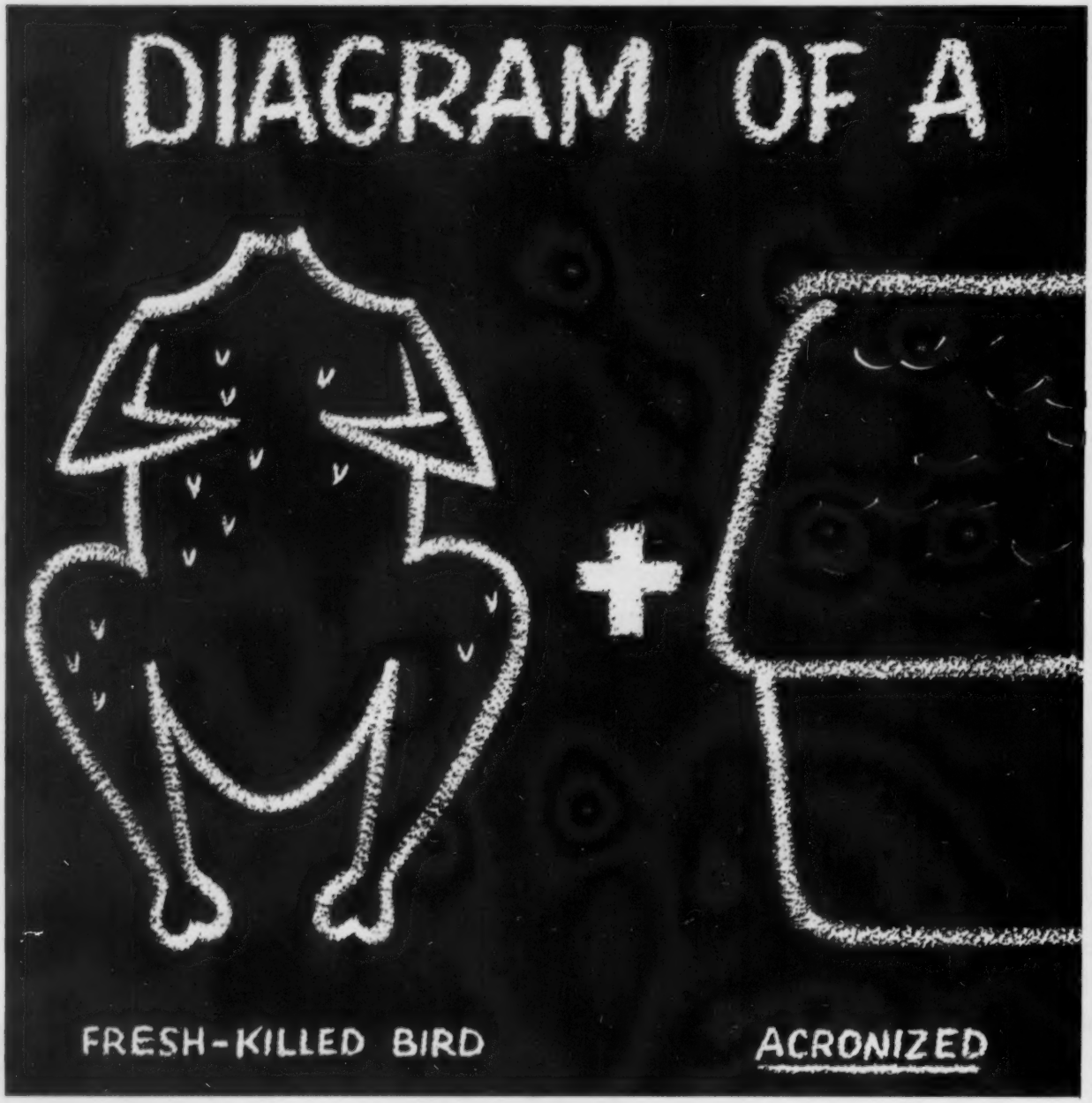
Today's most modern truck V8's—available at extra cost in whatever new lightweight model you need! Here's ultra-efficient short-stroke power for increased engine life and lower operating costs. New valve-in-head sixes are more powerful than ever!

And a wider range of Hydra-Matic models!
Driver efficiency goes way up with smooth-operating Truck Hydra-Matic on the job! Now available at extra cost on all light-duty and some medium-duty models, too. See your Chevrolet dealer for details and a deal on the right model for your job! . . . Chevrolet Division of General Motors, Detroit 2, Michigan.



CHEVROLET **NEW CHEVROLET TASK·FORCE TRUCKS**

Anything less is an old-fashioned truck!



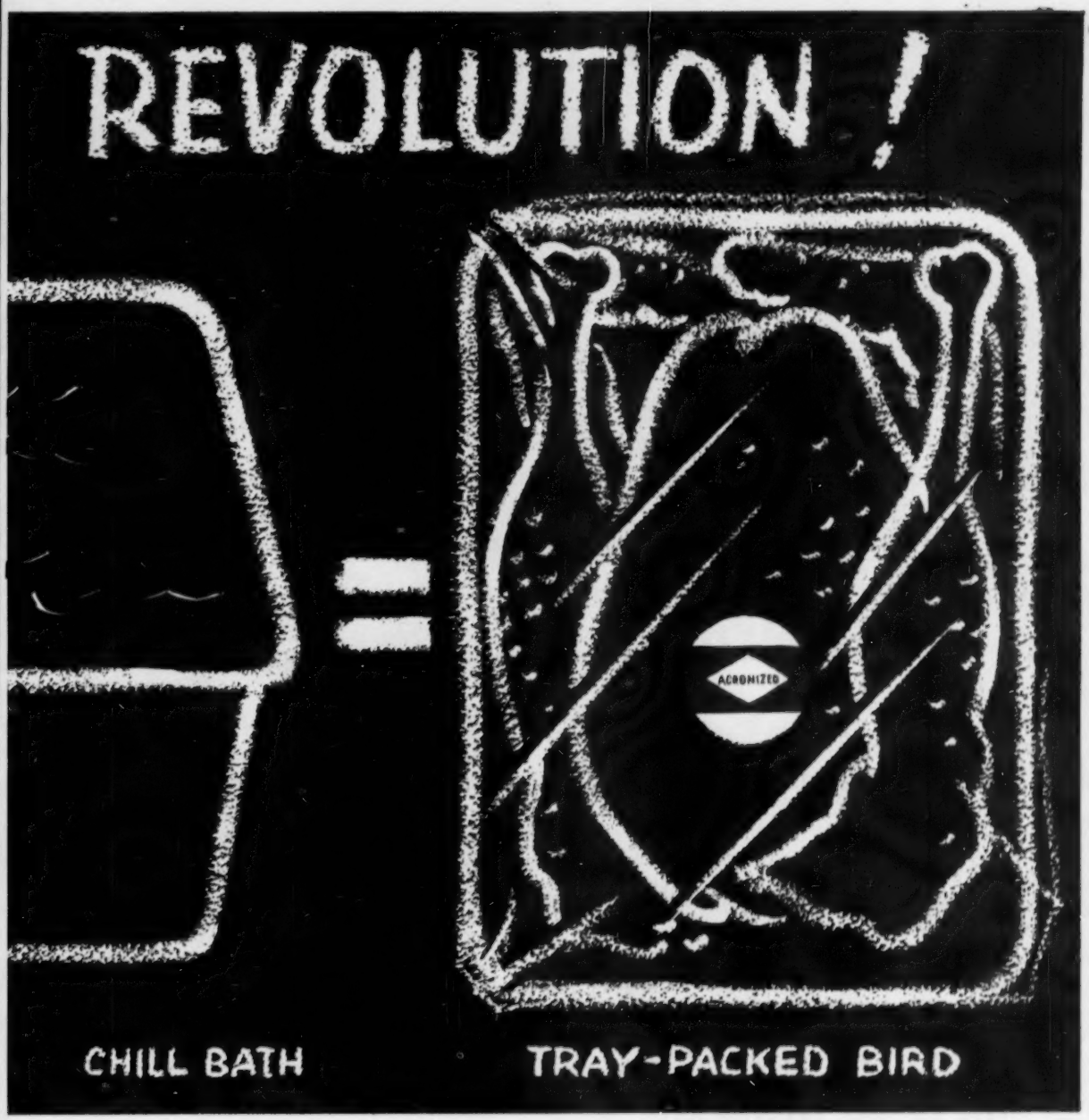
How **ACRONIZED*** did it...

*ACRONIZED is a trademark of American Cyanamid Company

Here you see in sketch form how Acronized has opened the door to vastly increased sales of poultry by solving the basic problem of *tray-packing*.

Acronized is the antibiotic cleared by the Government for use in maintaining poultry freshness. It is an exclusive development of American Cyanamid Company, based on its *chlortetracycline*, and is backed by years of research and testing.

Acronized solution—added to the standard chilling bath for fresh-killed poultry—maintains the freshness of the whole bird by slowing down the growth of spoilage bacteria. This makes it possible, for the first time, for you to



package either whole or cut-up poultry without risking the "incubator effect" that speeds spoilage.

Now you can offer your customers packaged poultry that is consistently fresh right into the consumer's kitchen . . . for under normal refrigeration *Acronized maintains the taste, color and country-freshness of the fresh-killed bird longer than ever before possible.*

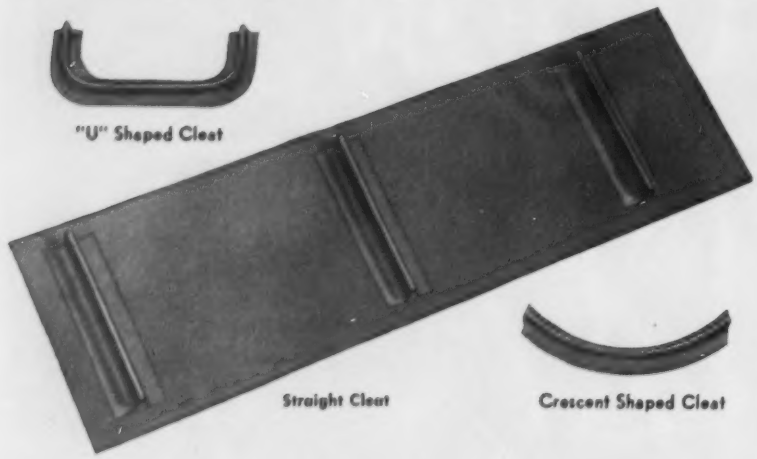
Write today for details on how your plant may qualify for the Acronized franchise.

AMERICAN CYANAMID COMPANY
Food Industry Department • 30 Rockefeller Plaza • New York 20, N. Y.

ACRONIZED
CHLORTETRACYCLINE ADDED TO RETARD SPOILAGE
A PRODUCT OF AMERICAN CYANAMID COMPANY

All **ACRONIZED** poultry, bulk or tray-packed, carries this seal

elevation + sanitation !



GLOBE flush-cleated NEOPRENE belting

Flush-cleated to the top surface of the belt — and formed so that there is no possibility of granular or powdered particles becoming embedded! Sturdy, odorless, tasteless, non-toxic neoprene, embedded and vulcanized into the neoprene belting to assure maximum sanitation with full carrying capacity on inclines.

Finest quality Globe belting with multiple layers of hard-woven light duck, vulcanized together with neoprene rubber between plies . . . plus a ¼-inch smooth cover on carrying side and friction surface on the pulley side. White or black . . . now with self cleats in a choice of three shapes.

Crescent or V-shaped to retain material and prevent side spillage of granular materials or straight cleats for package or bulk conveying on inclines.

Available in ⅜" and 1½" heights, widths up to 48", spaced at any required distance.

GLOBE CLEATS ARE ALSO AVAILABLE ON

KANRY-TEX BELTING treated with special latex compound impregnated into fibers of the belt . . . developed especially for food, fruit and vegetable conveying. Also available on stitched canvas or solid woven cotton belting.

Manufacturers of

White Solid Woven Cotton Belting · Woven Endless Belts · Webbings
Kanry-Tex Belting · Cellulose Belting · Plascell Belting
Belt Dressing · Waterproof and Wax Treated Belting
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GLOBE WOVEN BELTING CO., INC.
1400 CLINTON STREET • BUFFALO 6, NEW YORK
KNOWN FOR QUALITY THE WORLD OVER

Cost-Cutting Innovations

—*Continued from page 69*

hydraulic lift-gate of the semi-trailer. Raised to the level of the truck floor, dollies are pushed into the body, their wheels positioned in channels. Cross bars are inserted at two points to keep the load from shifting. Each set of channel-tracks accommodates 15 dollies, the load being a total of 30.

Formerly it required four men 4 hr. to load a semi-trailer with 3,000-3,600 gal. of ice cream in various size containers. With the basket-dolly system, two men now do the loading in a maximum of 30 min.—a savings of 16 man-hr.

At the branch plant, unloading is merely the reverse of the loading procedure. Labor savings, here, are the same as for loading.

Route drivers make out their orders at night and these are assembled in baskets by the night men in the storage room.

Returned dollies and baskets are first steam cleaned, then returned to the plant for use.

End (*Resume reading on page 70*)

3-Way Chocolate Line

—*Continued from page 91*

from the rotating wipers and drops it into a tank, from where it is pumped to the temperer.

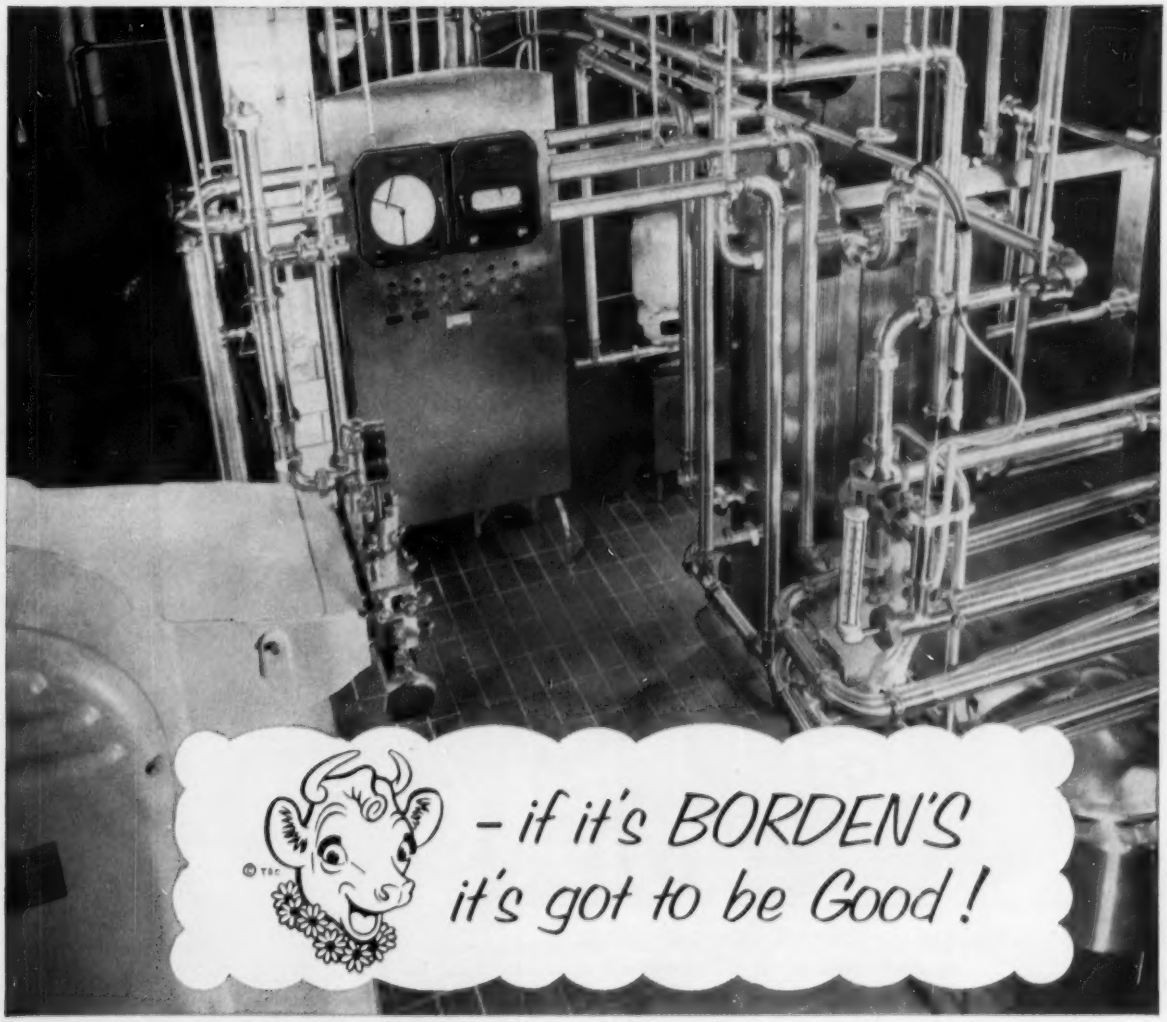
Chocolates are now vibrated on a third tapping table. Then a loading table collects molds in groups of eight and feeds them to a vertical cooler for final chilling. This cooler is designed for maximum economy of floor space. It has 57 frame holders, each holding a block of eight molds. Coil-refrigerated, the unit will handle up to 750 kg. (1,654 lb.) of chocolate per hour. Three fans circulate the cold air.

After molds have completed the cooler circuit, they discharge in blocks of eight onto a plate of the demolding machine. An operator places a sheet of paper on a second plate, and machine closes, bringing the two plates together in a vertical position.

Receiving plate then returns to the horizontal with the mold-plate pressed firmly to it. A tap loosens any sticking chocolates. When the mold-plate returns to starting position, chocolates are left on the paper.

An automatic mechanism pushes empty molds to the starting point of the candy line before the next block of full molds enters the demolder.

Solid chocolate articles are made by bypassing the shell-forming section



ONE of Elsie's best allies in making sure Borden products *are* good, is this Taylor HTST Control System, shown here at The Borden Company's most modern plant at Grand Rapids, Mich. Pictured above is a Creamery Package 16,000 lb. per hour Crescent Heat Exchanger and a C-P 2,000 gallon per hour Multi-Flo Homogenizer. The entire system utilizes the latest cleaned-in-place piping set-up.

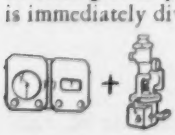
The Taylor HTST Control System comprises a Safety Thermal Limit Recorder (left section of case), a hot water temperature controller (right) and a Taylor Flow Diversion Valve. (lower right). Note also Taylor CLEANLINER* Thermometer.

There are several reasons why this Taylor system is so popular.

1. Completely automatic control. Pointer is set to the desired temperature. That's it. No re-adjusting of set point after diversion.

2. Gives greater protection. Sub-legal temperature milk is immediately diverted.

*Reg. U.S. Pat. Off.



3. Faster recovery time. Only one control valve, individually sized and selected for your operation.

4. Simple to operate. All control adjustments are ideally set at the factory. All instruments are housed in one case.

The new, redesigned Taylor HTST Control System is simpler, more dependable than ever before. Gives maximum protection in the pasteurizing of milk and ice cream mix. Ask your Dairy Equipment Supplier about its many advantages, or write for **Catalog 500A.** Taylor Instrument Companies, Rochester, N.Y., and Toronto, Canada.

Always specify "Taylor equipped as usual"

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

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More Profits
through Proctor Drying Ranges

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- Improved Air Distribution
- Faster, More Uniform Drying
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- Guaranteed Product Quality

PROCTOR CONTINUOUS CONVEYOR DRYER
AT NATIONAL YEAST COMPANY

Yeast requires sensitive drying methods. This Proctor & Schwartz installation at National Yeast Company maintains the uniform quality, color, and viability of the yeast at considerably increased drying rates.

Proctor equipment provides the control and flexibility essential to profitable drying performance. Many wet-solid materials heretofore unsuited to conveyor drying can now be handled with speed and efficiency. And, as with all Proctor equipment, guarantee *is in terms of finished product produced.*

WRITE FOR BULLETIN #390

PROCTOR DRYING EQUIPMENT — **WRITE FOR DETAILED INFORMATION**

- Tray Dryers
- Truck Dryers
- Pre-forming Feeds
- Continuous Conveyor Systems
- Spray Dryers

Proctor

PROCTOR & SCHWARTZ, INC.

Manufacturers of Industrial Drying Equipment and Textile Machinery — Philadelphia 20, Pa.

and shunting molds straight to the final depositor. Full molds pass through the three-bladed scraper, vibrator, vertical cooler, and demolder in the same way as filled candies.

Coupled-Motor Drives

For perfect synchronization, depositor motors (1 hp.) also operate most of the conveying equipment on the line. Drive is carried out with rods equipped with articulated joints.

Thus, the shell-forming depositor is directly connected to its two vibrators, the mold flipper and returning unit, and the shell cooler. The cream depositor runs its tapping table and cooling tunnel. And the final chocolate machine is joined with the tapping table, scraper, vertical cooler, and demolder.

The four transverse conveyors that move molds between the different operations are each powered by an individual motor, as is the special shell scraper. Likewise, the mold-heater conveyor is operated by a separate ¼-hp. motor. Vibrators on the tapping tables are driven by 1-hp motors.

All line drives have variable speed controls to regulate product flow.

Close Tempering Control

An automatic chocolate tempering machine is also attached to the Cavemil Crem Line. It consists of a water-jacketed, conical hopper, holding up to 285 lb. of chocolate. A scraper-stirrer agitates the mass continuously.

Chocolate is fed to the depositors by a helical screw, enclosed in a jacketed tempering tube. Clearance between tube and screw is sufficient to allow passage of even whole hazel nuts, as well as the chopped ones.

The tempering tube is divided into three sections, each with its own fully-enclosed, ohmic thermostat. These devices are connected to a large, recording thermometer on a central panel.

Close control of chocolate temperature is further aided by thermostatic valves on hot and cold water tanks that connect to tempering tube.

A pipe leads from the tempering tube back to the hopper, allowing operator to recirculate chocolate when filling operation is interrupted.

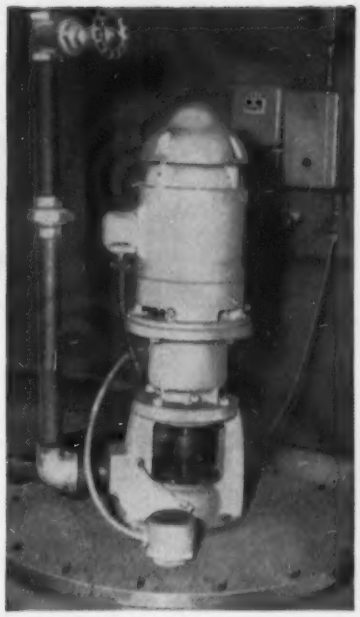
The largest tempering machine (7 hp.) has an output of 1,220 to 2,400 lb. of chocolate per hour (rate depends on temperature). Water consumption of this unit is 500 gal. per hr. The heating unit consumes power at the rate of 4,200w. per hr.

U. S. representative is Carle & Montanari, Inc., Hackensack, N. J.

End *(Resume reading on page 92)*

Solution

for a "PACKAGE" of Pump Problems



One of six Deming Turbine Pumps in condensate return service at The Morgan Engineering Company, Alliance, Ohio.

Deming Turbine Pumps

Plant engineers at The Morgan Engineering Company, Alliance, Ohio, leading manufacturer of cranes, presses and steel mill equipment, had a "package" of pump problems.

The Job was pumping hot condensate from steel sumps for return to steam boilers.

The Equipment included four obsolete condensate pumps with 3 HP electric motors and float controls.

The Problem was the failure of the original equipment to meet the job requirements efficiently and economically. Proper lubrication of the pump bearings was found impossible to provide. Frequent replacements of bearings and impellers was necessary. Float equipment gave almost constant trouble due to surges of steam. Here was a "package" of problems.

The Solution started by calling in the local Deming Distributor. Working "elbow to elbow" with the plant engineers, it was decided that Deming Vertical Turbine Pumps offered definite advantages.

1. The Deming Vertical Submerged Pumps with floatless controls eliminated the former float control troubles.
2. Only 2 HP electric motors were required by the Deming Turbine Pumps. The former condensate units required 3 HP motors.
3. Trouble in lubricating the bronze bearings of the condensate units was eliminated. Deming Turbine Pumps are self-lubricating (with the water flowing constantly through the pump when operating).
4. Using ⅓ less horsepower, the Deming Turbine Pumps did more work with a minimum of maintenance and at considerably less overall cost of operation.

Ask your nearest Deming Distributor or write us for a free copy of illustrated BULLETIN 4700 on Deming Vertical Turbine Pumps.

THE DEMING CO. • 556 BROADWAY • SALEM, OHIO

CALL YOUR DEMING DISTRIBUTOR for help on pumps!

Questions & Answers

THIS MONTH'S PROBLEM

Losing Refrigeration

Question—Recently, we decided to go into the frozen-foods field, and installed a small freezer with an ammonia-refrigeration system. At first, it seemed to work all right. Lately, however, we have noticed a slight loss in capacity and an increase in cooling-water usage. We don't know of any changes in our equipment or operation that would account for this. Could you suggest the possible cause and cure?

FEBRUARY PROBLEM

Bean Baking Query

Question—We have been considering the oven-baking of beans prior to canning. At present, we believe that a certain amount of water or sauce might have to be added during baking to replace moisture losses. Just how to do this without removing the pots from the oven is our immediate problem. Have you any suggestions?

Answer—Since you are only considering manufacture of this product, we assume that you have not yet purchased production equipment. In that case, it might be selected with a view toward facilitating moisture control with minimum labor.

So why not plan to do your baking in a reel oven—a unit something like a Ferris wheel? With this type of oven, the pots are quite accessible. It would be necessary only to rotate the reel to bring any tray full of pots to a working position. Loading and unloading of pots is thus facilitated, and floor space conserved.

If we correctly understand your proposed process, it would not be necessary to remove the pots to add moisture. And adding of water or sauce could be done as often as desired during the baking cycle.

To introduce water or sauce into each can of beans, we suggest a suitable length of stainless-steel pipe with an insulated handle and flexible hose connection to the liquid reservoir for directing the flow. The pipe tip could be shaped for proper distribution. Or it can even be fitted with a spray nozzle.

The amount of liquid could be controlled, if desired, by equipping the liquid-feed line with a timer-actuated solenoid valve. It admits a pre-determined quantity of water or sauce, shuts off to permit moving to the next container, and re-cycles.

Retorting Canned Meats

Question—How long must 4-oz. cans of Vienna sausage and 12-oz. cans of frankfurters travel through an exhaust box? What are temperatures in the exhaust box in both cases? After exhausting, how long and at what steam pressure should each type can be heat-processed in retorts?

Answer—In most cases, use of an exhaust box has been discontinued, because of excessively steamy conditions created in a room. Currently being employed are vacuum closing machines that have done away with the exhaust box. Cans are sealed under 15 in. of vacuum.

Four-ounce cans of Vienna sausage do not require exhausting. Cans of sausages are filled with 212-F. brine. Then cans are heat-processed 30 min. at 240 F.

Frankfurters can be steam-exhausted for 10 min. As for retorting, heat-process for 50 min. at 240 F.

Safety Suggestion

Question—A short time ago we had a nasty accident in our plant. One of our workers, operating a batch-type mixer, bobbed two of his fingers in the agitator blades while reaching into the machine for a scaling pail that accidently fell into it. We thought the machine was sufficiently safe, since it was equipped with a hinged cover. Have you any suggestions on how we can make the mixer completely foolproof against such possible accidents?

Answer—We suggest you install a snap-action microswitch on the mixing machine. Roller-lever actuator of the microswitch should be in direct contact with a piece of strap iron secured to the hinged cover. Then wire the switch in series with the agitator motor.

This switch will then serve as starter for the motor. Opening the cover breaks the circuit, thus stopping the motor and agitator. Mixer will not operate until cover is in protective position, closing circuit to the motor.

"Tapioca Cheese"

Question—In our dairy operations, we have had several occurrences of what is termed "tapioca cottage cheese." Normal sanitation practices are followed, yet we cannot find the source of contamination. Can you suggest possible cause and correction?

Answer—So-called "tapioca cheese" is traced to certain types of bacteria capable of growing at relatively low temperatures, thus called psychrophiles. They produce enzymes which attack proteins and fats. Some cause marked changes in flavor, and may also produce discoloration and sliminess.

First, it is important to see that thorough processing is observed. Most psychrophiles cannot stand pasteurization temperatures. Next, maintain thorough cleanliness of equipment, including packaging machines. While you probably are doing this, your trouble indicates that these precautions should be carefully reviewed for possible loopholes.

A major source of psychrophiles is the water supply—even one which passes usual public-health requirements. In fact, there may be even more of these cold-loving bacteria in

HOW TO DO IT?

Readers are invited to submit to Food ENGINEERING answers to question, "This Month's Problem." Selected answers will be published with credit (unless your specify otherwise). We pay space rates.

JUST ASK US

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

Q.—How can we stop globe valves on our pipelines from vibrating?

A.—Vibrations sometimes develop when the valve is closely throttled. If a valve is installed with pressure under the disk, vibration can be checked by turning it around so pressure is above the disk. On boiler-feed lines, where the A.S.M.E. boiler code legislates against pressure above the disk, place thin shims between the end of the stem and the disk to eliminate the clearance. If these steps don't stop valve vibration, consult the manufacturer.

Good Color

makes good food *Sell Faster*

Just a touch of the right color does so much to add display value and appetite-appeal to good foods and beverages. No other ingredient adds so much for so little.

National Food Color Laboratories are staffed with men versed in both food chemistry and color technology. If you are developing a new product or re-formulating shades for existing lines, our Food Color technicians will be pleased to work with you to develop just the right hue from National's long line of Primary Colors and Blends.

For your color needs, it always pays to call National first.

Write for your copy of the informative National Certified Color Catalog giving helpful information on blends for popular food-color shades, suggestions on the preparation and care of stock solutions for various food products and other useful data.

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Boston Charlotte Chicago Philadelphia Portland, Ore. San Francisco Toronto

Making control look easy

in automatic proportioning

These Richardson Scale Company technicians have an important job . . . checking out a remote control panel for a Richardson Select-O-Weigh Proportioning System. Large units or small, like this one—all get the same thorough pre-shipment test. Here accurate proportioning is made to look easy—just a matter of setting a dial. But there's *more* to automatic control than a control panel . . . much more!

Richardson engineers know that accurate control of material flow and exact proportioning *depend as much on precise design of storage bin, feeder, and scale* as they do on electronic perfection. The storage bin must be properly sloped to prevent bridging or flushing; the feeder must provide positive, consistent material movement; the scale must weigh accurately to within superfine tolerances. And all must be integrated to insure a dependable, correlated performance—without human supervision all along the way!

The value to you of a Richardson Select-O-Weigh system lies in the quality of your finished product . . . both now and for year after profitable year. Protection of that quality is worth greater consideration than initial cost (and Richardson costs less on a value per dollar basis). It is worth your thorough analysis of the proportioning system itself! Richardson invites you to analyze—and specify—Select-O-Weigh. Send for Bulletin 0351 for more information.

When it comes to proportioning, you're in good company when you come to Richardson. Look at some of the others who now have *proportioning by Richardson:*

The Firestone Tire & Rubber Company • General Foods Corp.
General Electric Company • U. S. Bureau of Mines
Reynolds Metals Company • American Rice Milling Co., Inc.
Union Carbide & Carbon Corporation • Ford Motor Co.
Fleischmann Distilling Corp. • The Flintkote Company
Johnson & Johnson • National Distillers Products Corp.
Owens-Illinois Glass Co. • Pittsburgh Coke & Chemical Co.
Celanese Corp. of America • Goodyear Tire & Rubber Co.
E. I. Du Pont de Nemours & Co., Inc. • and many more.

Richardson

MATERIALS HANDLING BY WEIGHT SINCE 1902

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city than in well water. Therefore, make a special study of your water supply. Check it for presence of psychrophiles by inoculating the water in sterile milk and observing samples for growth after 5 days at 45 F.

Another contamination source may be cottage-cheese wash water. Or, these bacteria may enter through a leak in a cooler, or by inadvertent entry of condensate at some point. They might even come from rinsing after sanitizing equipment.

If you trace these spoilage organisms to the water supply, the solution is chlorination. Chlorine content of 5-10 ppm. is generally recommended to kill these organisms. You may obtain equipment for automatic chlorination from manufacturers, who will be glad to recommend the proper size and type unit for your particular needs.

Making Lobster Newburg

Question—We'd like to include lobster a la Newburg into our line of frozen specialty foods. Do you have instructions for making it?

Answer—Saute for about 3 min. in jacketed kettle 25 lb. of diced, boiled lobster meat in 3¾ lb. of butter or margarine. Longer cooking might toughen the lobster meat.

Add and blend into batch: Salt, 5 oz.; paprika, 2½ oz.; ground red pepper, 2½ oz.; and ground nutmeg, 2 oz.

Introduce 27½ lb. of cream sauce. Then stir until batch thickens and becomes smooth.

Cool batch and add, with agitation, 40 oz. of sherry wine. Package and freeze.

Hydrogenating Own Oil

Question—Recently, we tried to hydrogenate vegetable oil as a peanut butter stabilizer to replace the hydrogenated stabilizer we were buying. Thinking it was an easy process, we used a nickel catalyst but experienced flavor reversion in the hydrogenated oil. Since we are very anxious to correct this, can you suggest the cause and correction?

Answer—Without process details, it is difficult to offer a complete survey of possibilities. However, there may be nickel contamination from the catalyst. Although you probably are filtering the oil after hydrogenation to remove finely-divided nickel particles, some nickel can pass through the filter, either as a colloidal dispersion or soap. Flavor and color reversion may result.

To remove much of the colloidal nickel, mix about 2% of bleaching

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earth and 0.5% of filter aid with the oil and recirculate through a filter press until oil is clarified. Even better results can be obtained by adding 0.05% citric acid (as a 20% water solution), which forms nickel complexes that do not bring about flavor reversion. This method may achieve more economical use of bleaching and filter aids, while shortening filtration time.

Circulate the hydrogenated fat through the filter press until the product displays a negative test for nickel.

More on Pot Pies

Re your formulas for pot pies (FE, Nov., '55, p. 184), here's one for a filling that we've found successful:

Brown 60 lb. of cubed meat (veal, pork, beef, chicken, or turkey) in kettle with 10 lb. of lard. Add 41¾ lb. of 180-F. water, cover kettle, and simmer until meat is tender (about 1 hr.).

Cook 20 lb. of sliced celery and 20 lb. of sliced carrots in 82½ lb. of 212-F. water. After ½ hr., add 10 lb. of peas, 40 lb. of potatoes, and 1 lb. of grated onions.

Continue cooking until tender. Drain vegetables, and add vegetable water to meat.

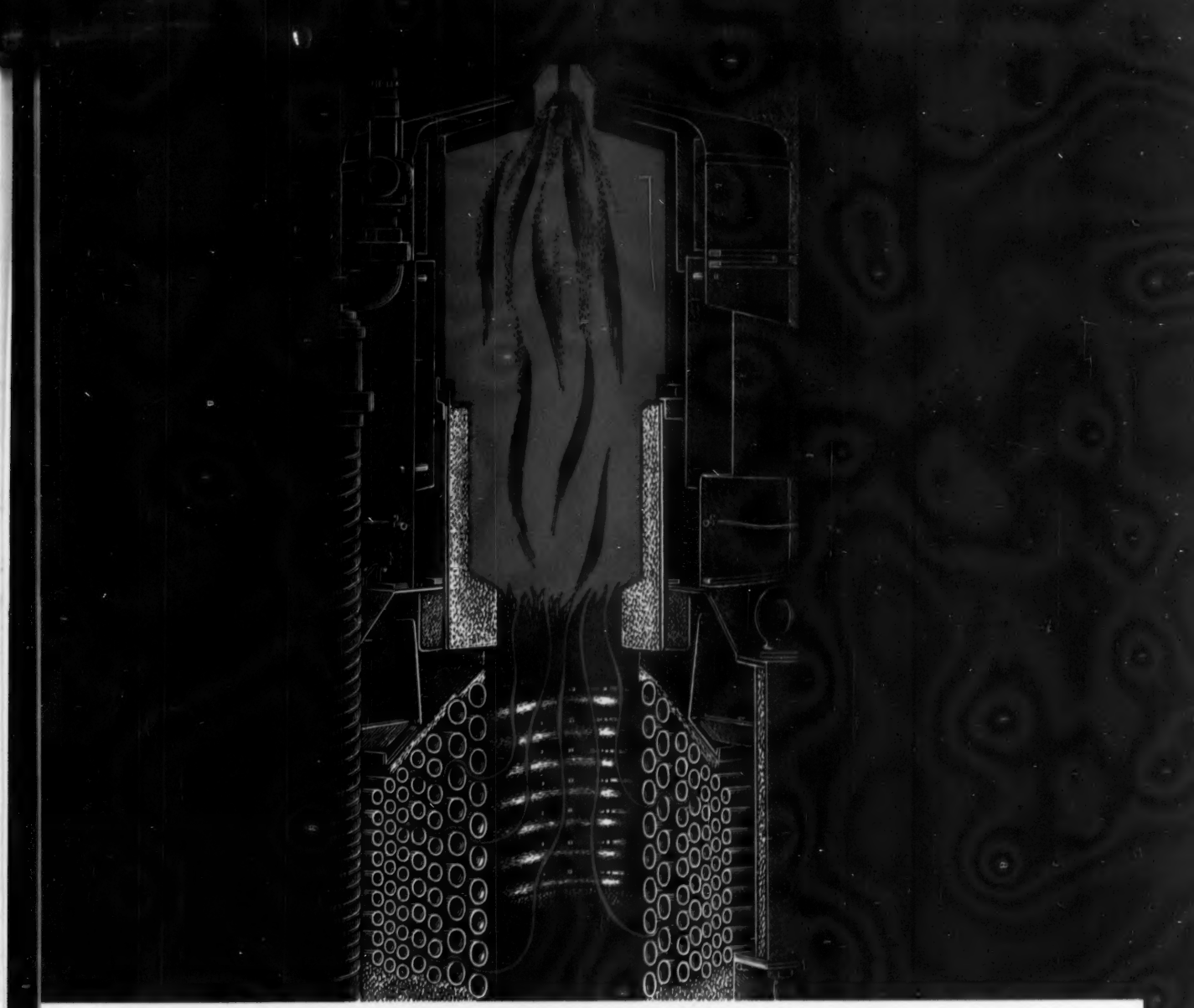
Dissolve 8 lb. of concentrated meat extract (like Armour's Vitalox or Wilson's B-V) in 5 qt. of hot water, and thicken with 5¾ lb. of flour (made into paste with water). Add thickened, concentrated meat extract, along with vegetables, to batch of meat and vegetable water. Mix thoroughly, add to individual aluminum pie pans, cover with pie dough, pack into printed cartons, and freeze.—*FE Reader.*

Q.—Can you furnish a simple formula for baker's marshmallow powder?

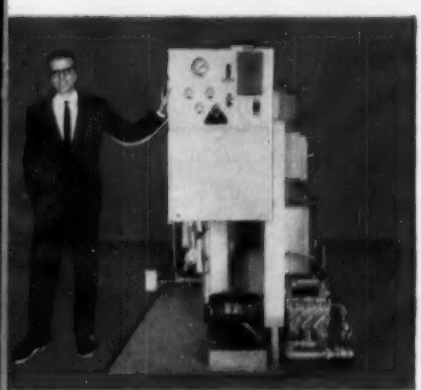
A.—Thoroughly blend with 91.42% of powdered sugar, 2.86% of powdered gelatin, 2.86% of powdered egg albumen, and 2.80% of powdered gum Arabic. Flavor to suit with vanillin. Baker uses 2¼ lb. of powder to a quart of warm water.

Can't Get Cook Pressure

Question—We are cooking potatoes in an autoclave, which holds about 1,800 lb. in a single batch. We wish to cook under about 20 lb. pressure, but we are having difficulty getting our pressure and temperature to the proper point. We think this may be



more steam, faster steam in less space



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due to the fact that the cold raw potatoes condense the steam as fast as it enters the vessel.

We have air vents on top of the vessel which we keep open about 7 min., during which time the pressure does not go up over zero. After the air vents have been closed, the pressure rises slowly and the temperature even more slowly. At the end of about 30 min., we may have reached a temperature of 195 deg. F.

Can you suggest any way in which we can speed up our process? Also can you suggest what size and type of trap we should use, remembering that there is a fairly large volume of condensate, and the condensate carries a lot of starch which comes from the potatoes?

Answer—There are a great many factors having a bearing upon the speed of your cooking process. In order to make really definite recommendations, it would be necessary to have full details on the equipment, piping, your steam conditions, etc. The following suggestions, though necessarily general, may prove helpful.

Why don't you start by trying to calculate the pounds of steam required to raise the cold potatoes to cooking temperature, based upon the initial raw material temperature and the desired cooking temperature (20 lb. corresponds to about 260 deg. F.), and your steam pressure and temperature?

Then from a handbook, check to see whether your existing steam-supply line and inlet to the autoclave are large enough to pass the calculated number of pounds of steam in any shorter time than is now required for come-up. This should serve to indicate whether the excessive time is because of inadequate steam supply, or inadequate condensate removal.

Obviously, if it is the former, no amount of changes to your traps will wholly correct your trouble. You will then want to increase the size of the steam line, and perhaps also provide

---

Q.—Can you offer me a formula for shrimp sauce that can be packed in jars?

A.—Blend together 30¼ lb. of chili sauce, 15¼ lb. of prepared horse radish, and 4½ lb. of Worcestershire sauce. Rather than packing into jars, you might look into the possibility of putting up the sauce in a polystyrene container with a polyethylene snap-on lid and freezing the product. Reason is that jar-packed sauce loses strength upon standing, since the horse radish deteriorates.

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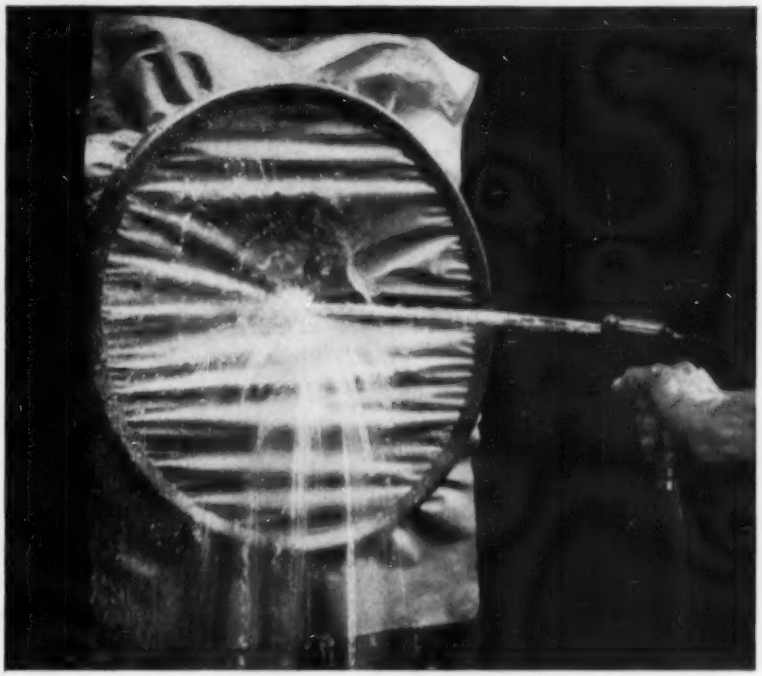

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more efficient insulation of steam line and autoclave. Sometimes, there will be considerable condensation in a long steam-supply line, in which case it is good practice to provide a trap to discharge this condensate just ahead of the autoclave.

If the foregoing analysis indicates condensate removal to be the root of the trouble, then, of course, you may need to install a larger-capacity trap. We cannot estimate the exact size, as it will depend upon the pounds of condensate to be discharged and the time you wish to allow for the batch come-up. However, any reputable trap manufacturer would be competent and willing to analyze your equipment and process, and recommend both the size and style of trap best suited to your needs.

We would further suggest that you check the method of steam distribution at the inlet, to make sure that steam does not "channel." A pipe cross, with small holes drilled along each arm, is often used for a similar purpose in the canning industry.

Finally, we believe it would be helpful for you to check on the efficiency of your air venting by simultaneously taking readings of autoclave pressure and temperature. From your steam tables, you can determine what the correct steam temperature is for any particular pressure, and if the observed temperature is lower than it should be, it is a good indication that you have air pockets. These will slow down the come-up time. Air pockets should be eliminated by enlarging the air vents or adding to their number.

A Big Soup Order

Question—Can you furnish me with formulas for making green pea, vegetable, chicken consomme, chicken-rice, and cream of mushroom soups?

Answer—*To make green pea soup:* Slowly cook for ½ hr. in steam-jacketed kettle 18-¾ gal. of peas (fresh or canned), 250 lb. of veal soup stock, 75 lb. of water, ¾ lb. of diced onions, 3½ lb. of sugar, 1½ lb. of salt, and ½ lb. of ground pepper (white) along with sufficient mace and bay leaves to suit your taste.

Run batch through a rotary screen finisher, and return to kettle. Now introduce a heated blend of butter (9½ lb.) and corn starch (5¼ lb.). Boil 5-7 min., add 81¼ lb. of milk. Immediately fill into cans, seal, heat-sterilize, and cool.

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one, modifying it to your requirements.

Dice into ¼-in. cubes 2½ lb. of peeled carrots, 1 lb. of peeled turnips (yellow), 1 lb. of peeled onions, 1 lb. of celery (leaves and all), and 2 lb. of peeled potatoes. Then add 1½ lb. of green peas and 2 lb. of corn. Steam-blanch vegetables and chill in cold water.

Finely chop 1 oz. of red chili peppers and ¼ oz. of garlic. Soak overnight 1¼ lb. of rice and ½ lb. of dry lima beans. Cook 1 lb. of pearl barley for 3 hr.

Add 12½ gal. of beef soup stock into agitator-type jacketed kettle along with 1¼ lb. of flour and ¼ lb. of salt, and form into a thin paste. Add vegetables and can.

Chicken consomme — Cook in steam-jacketed kettle 100 lb. of chicken in 280 lb. of water until meat strips easily from bones. Return only bones to soup stock and cook an additional 2½ to 3 hr. Remove bones, strain stock, and then add salt, white pepper, garlic powder, and powdered celery seed to suit. Finally can.

Q.—How can we get rid of the rainbow-like colors in our stainless steel vats?

A.—Polish lightly with a fine abrasive material like crocus cloth or 300 to 400-grit (not emery) paper.

Chicken-rice consomme—Add 8 lb. of soaked rice to 100 lb. of chicken consomme.

Cream of mushroom soup—Finely chop 25 lb. of washed mushrooms. Add mushrooms to jacketed kettle and cook with 12½ lb. of margarine until mushrooms start to brown. Sift into batch 3¼ lb. of flour, and slowly add 210 lb. of milk. Season to suit and cook until thickened.

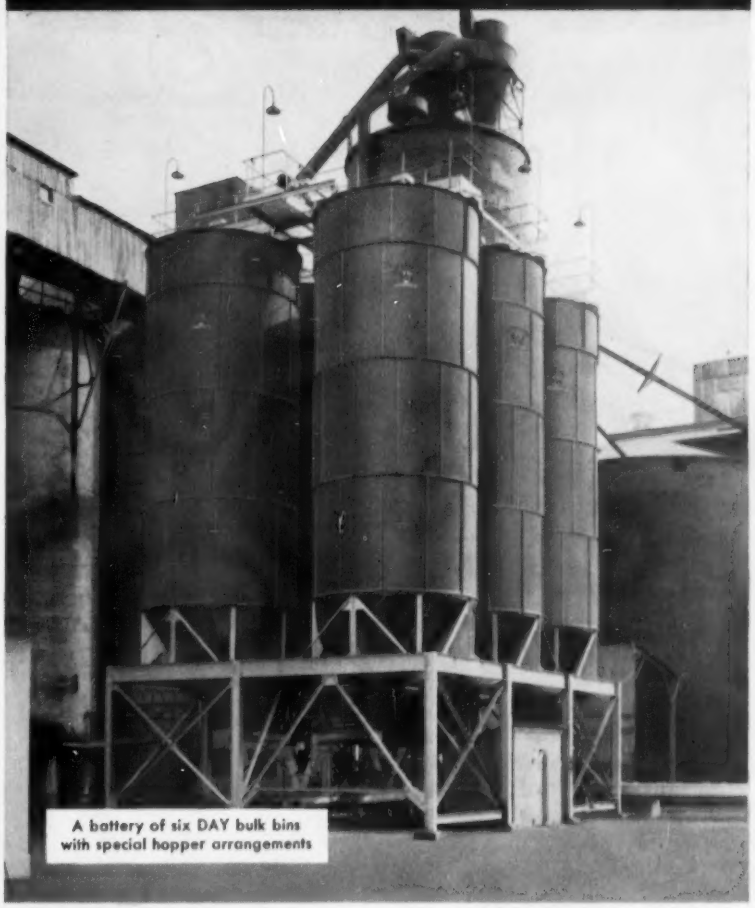
French Fried Onions

Q.—Have you directions for making French-fried onions that are to be packaged and frozen in consumer-size cartons with cellophane linings?

A.—Cut large Spanish or Bermuda onions into ¼-in. slices and separate into rings. Drop rings, a few at a time and until well moistened, into a batter consisting of 1½ parts of well-beaten whole eggs and 9 of fresh milk. Drain and evenly coat batter-dipped slices with flour.

Place coated slices on wire tray and gently shake to remove excess flour. Put them into French-frying basket and deep-fat fry (380-400 F.) until golden brown. Package into greaseproof paper-lined cartons, and freeze.

Economical Bulk Storage



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Two-Way Refrigeration

—*Continued from page 89*

truck's engine, it provides alternating current which is rectified and regulated into a constant 90v. direct current—regardless of engine speed—to operate the compressor and the evaporator fan.

Alternator is specifically designed to deliver a variable-frequency alternating current over a wide speed range of 1,500 to 10,500 rpm.

It is carried on a standard SAE mounting bracket attached to the left side of the engine block behind the radiator fan. It is driven by two V-type wire-core belts off a pulley on the engine crankshaft. A slack adjuster maintains belt tension.

Alternator is self-excited by power from DC side of rectifier, and augmented by a 7v. boost from truck generator. Output, via 3-phase stator windings, passes through the rectifier. The 90v. DC output regulation is obtained by adjusting armature field potential.

Rectifier is grouped with the compressor, compressor motor, condenser, and regulator in the truck-body structure outside of the body's cold compartment and thermally insulated from it. Evaporator and fan are either mounted atop condensing unit or split into separate units installed in the refrigerated space.

Operation When Parked

For standby service—when the truck is garaged or stored outside overnight, for example—current is fed in through a plug-in extension, and is rectified to drive compressor and fan. Changeover is effected merely by unplugging, and starting the truck engine.

The accompanying photos show system placed in an isolated box in the left rear corner of the refrigerated compartment, but the assembly may be positioned to fit user's needs. The regulator and plug-in socket are accessible through a small, hinged, ventilated door, permitting handy insertion of outside power lead.

End (Resume reading on page 90)

Organic Chelates

—*Continued from page 61*

ily be displaced from its chlorophyll complex by copper or iron.

Inorganic cations also differ in the case with which they coordinate. Sodium has little tendency to form complexes, while copper does so readily.

Stability constants for EDTA complexes have been determined. Unfortunately, they are of limited value in dealing with the problem of which metal, and how much, is complexed, or will be complexed, and by what substance in a given system. There are, even in the simplest foods, a variety of competing substances in addition to a specific metal and a complexing agent.

These include other metals, hydrogen and hydroxyl ions, precipitants, absorbents, and other chelating agents. Theoretically, such systems are amenable to mathematical treatment, but practically the empirical approach often is the only reliable one.

Nevertheless, a qualitative consideration of some of the factors is useful.

Details of Action

In the case of EDTA, the actual complexing agent is the completely dissociated ion, concentration of which increases with increasing alkalinity. Thus, EDTA complexes more metal at higher pH. As pH decreases, the concentration of metal cations increases.

Accordingly, 1 mol of EDTA complexes 1 mol of Ca^{++} in the presence of oxalate at pH 8.5, but increasing amounts of EDTA are required to prevent precipitation of calcium oxalate as pH drops. Copper and iron chelates, like ZnEDTA, exhibit relatively little dissociation in the acid range.

Glycine and EDTA form copper chelates whose stability constants are almost of the same order of magnitude. Glycine is almost as effective in complexing copper in the alkaline range. But in the acid range it is of little value (compared to EDTA) because of suppressed concentration of the complexing species.

It is of some interest that glycine forms less stable complexes with increasing polymerization, but the ability of the polymers to complex at physiological pH's increases.

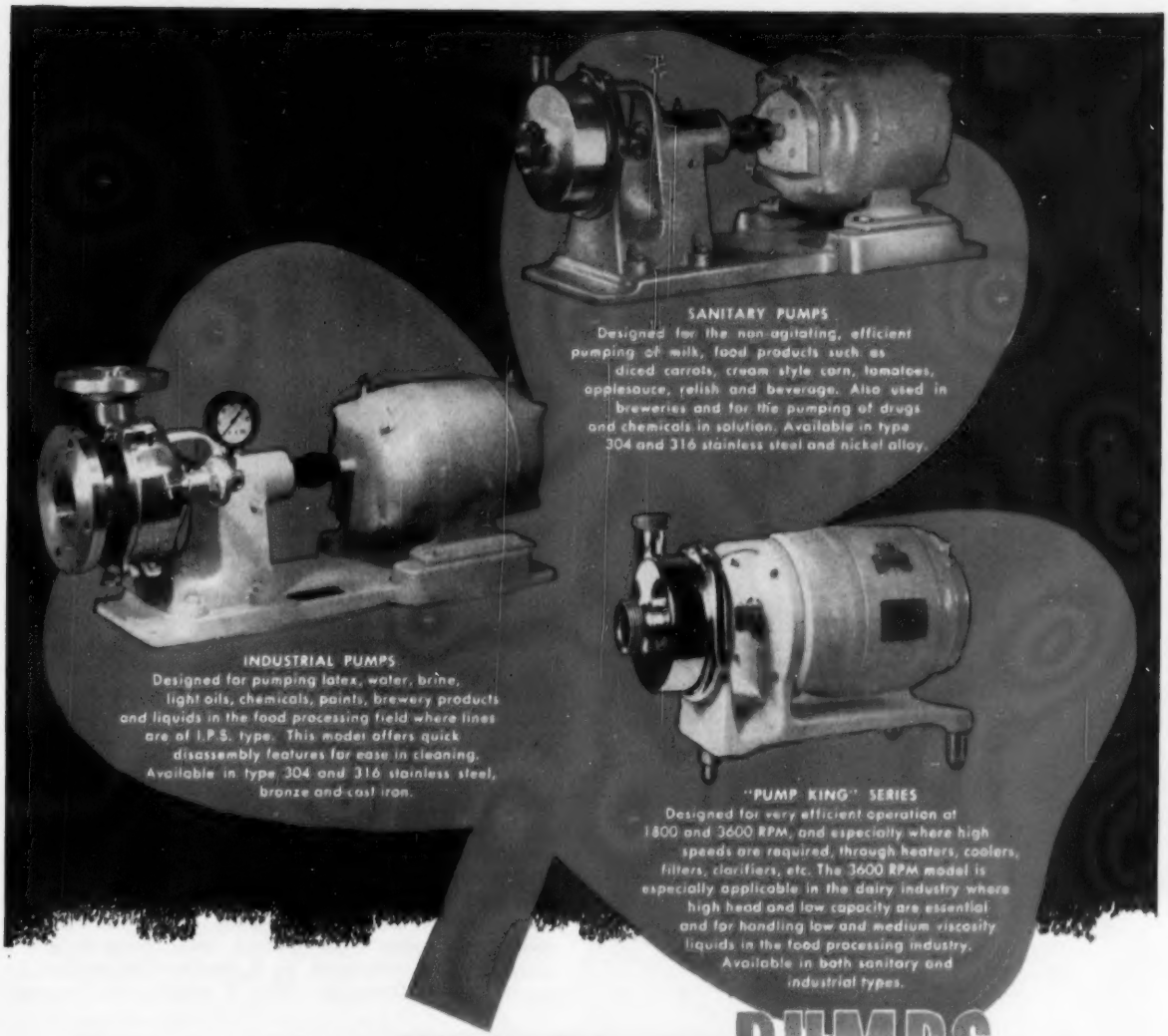
Reaction Equilibrium

Hydroxyl as well as hydrogen ions compete with metal ions for the complexing agent when the metal forms an insoluble hydroxide. This is a special case of the more general situation, which may be represented by the equilibrium:

$$MX + Y = MY + X$$

where X is the precipitant.

If the reaction can be forced to the right, and if the complex is soluble (as EDTA), then the precipitate will dissolve. This occurs when the stability constant of MY is greater than the reciprocal of the solubility prod-


SANITARY PUMPS
Designed for the non-agitating, efficient pumping of milk, food products such as diced carrots, cream style corn, tomatoes, applesauce, relish and beverage. Also used in breweries and for the pumping of drugs and chemicals in solution. Available in type 304 and 316 stainless steel and nickel alloy.
INDUSTRIAL PUMPS
Designed for pumping latex, water, brine, light oils, chemicals, paints, brewery products and liquids in the food processing field where lines are of I.P.S. type. This model offers quick disassembly features for ease in cleaning. Available in type 304 and 316 stainless steel, bronze and cast iron.
"PUMP KING" SERIES
Designed for very efficient operation at 1800 and 3600 RPM, and especially where high speeds are required, through heaters, coolers, filters, clarifiers, etc. The 3600 RPM model is especially applicable in the dairy industry where high head and low capacity are essential and for handling low and medium viscosity liquids in the food processing industry. Available in both sanitary and industrial types.

These efficient Tri-Clover PUMPS can pump any product that will flow to them . . .

ANY product that will flow to them can be handled efficiently and economically with Tri-Clover non-agitating centrifugal pumps. Illustrated are just three of the many Tri-Clover pump models used extensively in food processing, brewing and bottling, chemical process and general industrial applications. Pumps are available in stainless steel, nickel alloy, bronze and cast iron.

Designed for efficient liquid transmission and low cost maintenance, these pumps have many exclusive features, among which are—patented screw type impellers with quick-acting impeller clips, lightweight heads with a minimum of parts, casing construction permitting fast, easy assembly or disassembly—and a wide choice of seals for various applications, including inert carbon rotary seals for sanitary application, packing gland seals, water cooled seals and seals for latex handling.

Tri-Clover's exclusive developments are the result of many years of specialized engineering experience and thorough knowledge of liquid handling. Let our engineering staff work with you in solving your pumping problems.

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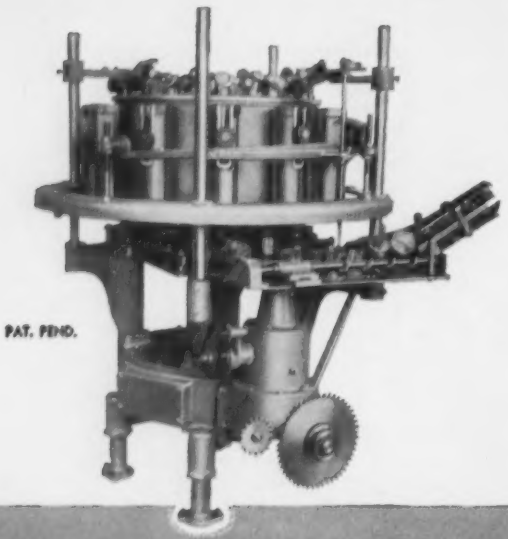
3 MORE REASONS WHY W. F. & JOHN BARNES CAN *help You* CUT FOOD PROCESSING COSTS



PAT. PEND.

LIBRASCOPE FILLERS
FEATURE HIGH OUTPUT . . . LOW MAINTENANCE COSTS

PISTON-TYPE (*shown at left: a 12-station model set up to handle dog food*) — A range of standard models are available for a variety of liquids and semi-liquids to meet production requirements from 40 to 1000 containers per minute. Units feature exclusive new Librascope self-cleaning action that prevents build-up of product on valve guides and ports — eliminates frequent cleaning operations. Plunger-type valve design maintains positive closure against leakage, assures correct filling level, and provides longer valve life. Product contacts are 316 stainless steel or non-copper alloy for utmost surgical cleanliness. Manufactured by Librascope, Inc. Exclusive distributor: W. F. & John Barnes Company.

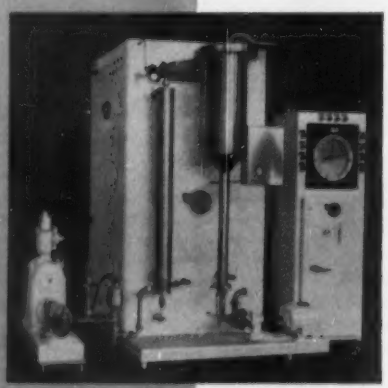
OTHER LIBRASCOPE FILLERS — Include Model G (Gravity), Model GP (Gravity Pocket), and Model PB (Bottom Fill Piston). With 6, 9, 12, 18, 27, or 36 stations.

Designed for Greater Efficiency

NEW GAS GENERATOR
NEW HEAT EXCHANGER

PAT. PEND.

◂ **S-I-A GAS GENERATOR** — Compact unit provides accurate control of protective atmospheres in processing and packaging food and other products. Maintains constant, oxygen-free atmosphere to prevent deterioration and spoilage of product. Range of standard models available to meet a variety of needs for bulk or package storing, dehydration, drying, shipping, and metal, glass or plastic packaging. Manufactured by Barmotive Products, Inc. Exclusive Eastern Distributor: W. F. & John Barnes Company.



PAT. PEND.

◂ **BARNES ROTO-JET HEAT EXCHANGER** — New heat exchange system utilizing steam injection for sterilizing liquid and semi-liquid products. Purified steam is transferred directly to the product without heat loss, insuring maximum efficiency and economy. Unique control system maintains processing temperatures within ± ½-degree F., and exacting instrumentation affords a balanced product moisture content. Manufactured and sold by W. F. & John Barnes Company.

Write **FOR FREE LITERATURE** — illustrates and describes these profit-making production units.

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RETORT BASKET LOADERS AND UNLOADERS
DOLE ASEPTIC CANNING EQUIPMENT • UNIVERSAL CASE PACKERS

uct of MX, with all components present in equimolar concentrations.

For EDTA, the stability constant of the Ca complex is about $4x10^{10}$. Since the solubility product of calcium oxalate is $2x10^{-9}$, and for calcium carbonate $0.9x10^{-8}$, either of these sparingly soluble compounds dissolves in EDTA solutions. Calcium fluoride with a solubility product of $3.4x10^{-11}$ will not dissolve unless a large excess of the EDTA reagent is used.

Iron hydroxide has a solubility product of 10^{-38}, while ferricEDTA complex has a stability constant of 10^{+25}. So long as the OH^- concentration is kept low, EDTA will prevent precipitation of $Fe(OH)_3$. As concentration of the hydroxyl ion increases above 10^{-9} (pH 5), it rapidly decreases in effectiveness as a solubizing agent for iron.

Other Applications

Chelating agents have found numerous applications as solubilizers or precipitation inhibitors. In the examples cited, stochiometric and mass-action effects pertain, but in other cases they may not because something more than chelation is involved.

Solubilizer: Hexametaphosphate inhibits for limited periods the precipitation of large molar excesses of calcium carbonate—a valuable effect in water treatment. Its action is attributed to interference with crystallization at the sub-microscopic level.

For iron, there is evidence that polymeric iron hydroxide may be stabilized in a colloidal or sub-colloidal condition by hydroxy acids such as citric. One mol of citrate may keep more than 5 mols of iron from precipitating for relatively long periods.

Antioxidant: EDTA may compete with another complexing agent for a metal ion, as in the stabilization of ascorbic acid against pro-oxidants. Here, it is effective in very low concentrations.

Color Stabilizer: FDC colors often are sensitive to trace metals, deteriorating seriously due to formation of metal-dye complexes. If EDTA has a greater affinity for the metal than does the dye, it will correct the color. Should EDTA and the dye have about the same affinities for the metal, large amounts may be required for correction.

The above article is based on a talk given at a recent meeting of the New York Section of the Institute of Food Technologists by H. W. Zussman, Manager, Industrial Chemical Division, Geigy Chemical Corp., New York City.

End *(Resume reading on page 62)*

PECTINOL

PECTINOL enzymes are effective in producing juice of sparkling brilliance, and facilitating the extraction of juice from pulpy fruits.

The improvement in processing efficiency is considerable. For example, it may increase yields of juice as much as 7 percent in crushing. And it increases filtering capacity up to 500 percent. These savings are usually more than enough to cover the cost of PECTINOL—about ½ cent per gallon of clarified juice.

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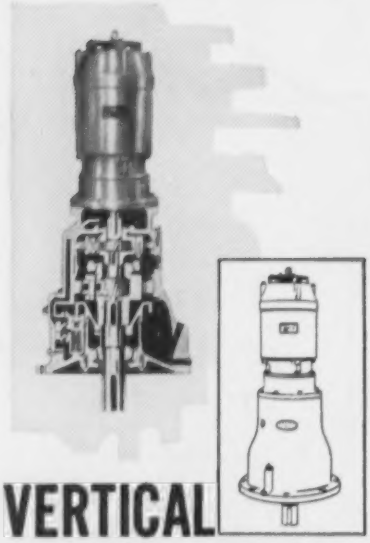
Philadelphia
MOTOREDUCER



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SHAFT DRIVE

For a compact, neat and sturdy self-contained Vertical Speed Reducer, the Philadelphia MotoReduceR is tops in design, construction and operation. The unique single casing and bolted-on motor construction . . . makes mounting and installation very simple, and of course, it eliminates base plates and couplings. The planetary, in-line reduction gears provide a rugged drive capable of withstanding severe overload conditions . . . Other features are: wide bearing span, permitting use of long, unsupported vertical shafts; Exclusive "dry-well" construction, which prevents oil leaking down output shaft.

Philadelphia MotoReduceRs can be supplied for output speeds from 9 R.P.M. to 420 R.P.M. with standard motor speeds . . . Units up to 100 H.P. are available—and a full range of horizontal units can also be supplied.

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Useful New Books & Government Publications

Mathematics of Vectors

VECTOR ANALYSIS *By Homer Newell, Jr. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York City 36. 1955. 216 pages. 6¼ x 9¼ in., cloth. Price: $5.50.*

Latest in the International Series in Pure and Applied Mathematics, book deals with a particularly useful and powerful tool for the engineer and physicist.

Part I covers vector algebra and the vector calculus. Part II is devoted to practical applications.

A comprehensive treatise on a complex subject, text is of interest to food engineers and lab men.

Two Vacuum References

1954 VACUUM SYMPOSIUM TRANSACTIONS *Published by Committee on Vacuum Techniques, Inc., Box 1282, Boston 9. 1955. 147 pages. 8¾ x 11¼ in., cloth. Price: $10.*

The importance of vacuum techniques and equipment in the food industry is undeniable. The rapidly advancing technology of the field has led to larger and more complex vacuum problems. This work may serve as a valuable guide in solving such difficulties.

Book is compiled from abstracts of the 1954 meeting of the Committee. Among topics discussed are: Equipment and Instrumentation, Methods and Techniques for Obtaining High Vacuum, Development in Vacuum Technology, Applications and Processes, and Standards.

THE DESIGN OF HIGH VACUUM SYSTEMS AND THE APPLICATION OF KINNEY'S HIGH VACUUM PUMPS *By C. M. Van Atta. Published by Kinney Manufacturing Div. New York Air Brake Co., Boston 30. 1955. 68 pages. 7¼ x 10 in., paper. Price: $5.*

Evolving from mimeographed discussions of vacuum pump systems used by sales engineers in the Kinney Manufacturing Co., this useful and compact text offers a detailed and authoritative presentation of vacuum pumps and their application.

Brought up to date to include all of the latest developments in the vacuum system field, book is a valuable addition to food processor's shelf.

Booklets and Reports

TESTED APPROACHES TO CUTTING PRODUCTION COSTS. *(Special Report No. 4) Published by American Management Assn., 330 W. 42nd St., New York City 36. 1955. 128 pages, paper. Price: $3.75 ($2.50 to members).* Cutting overhead, materials, payroll.

FE REPRINTS AVAILABLE

Listed below are special sections, flowsheet book, and articles from past issues of FOOD ENGINEERING which are available in reprint form. Single-copy prices are listed. For orders of 20 or more, there is a 25% discount. You order the reprints by circling the corresponding numbers on the Reader Service Coupon, inside the back cover. You will be billed when your order is filled.

1. Meat Special $1.25

Contains a series of 9 articles: (1) Cold Sterilization Problems. (2) New Continuous Lard Process. (3) Progress in Meat Dehydration. (4) High-Speed Chub Packaging. (5) Atomic Irradiator Designed. (6) Improvements in Unit Tasks. (7) New Processes for Old Products. (8) Map Unravels Delivery Snags. (9) Saves 50% of Retort Steam.

2. Dairy Special $1.25

Ten timely articles are included: (1) Dairymen Face Challenging Changes. (2) New Processes for Instant Dry Milk. (3) Controls Presage Automatic Dairy. (4) Save With Cleaned-in-Place Pipes. (5) Bi-Oxidation Solves Waste Problem. (6) Cheese Keeps in Antimycotic Wrap. (7) Plastic Tank for Milk Trailers. (8) Bulk Handling Aids Processors Too. (9) Advanced Dry Milk Flowsheet. (10) "Tracers" Detect Foreign Fats.

3. Ingredient Special $1.25

Ten articles helpful in improving product formulation: (1) Chemicals Still a Question. (2) Role of Antioxidants. (3) MSG —Unique Enhancer. (4) Tailored Salts Add Values. (5) Ascorbic Acid Betters Meats. (6) Dry Solubles Are Versatile. (7) Sugar Types and Uses. (8) Latest on Low Calories. (9) True-Fruit Hows and Whys. (10) Stepping Up Nutrition.

4. Packaging Special $1.25

Six articles of practical value: (1) Flexibles Are Revamping Packaging Pattern. (2) How To Avoid Damage in Shipping. (3) Bundling Frozen Foods. (4) One-Portion Packets. (5) Automatic Packaging Line. (6) Paper Vs. Glass.

5. Canning Special $1.25

Eight articles on significant developments: (1) High Frequency Looms as Improved Cooking Method. (2) New Twist in High-Short Retorting. (3) Full-Flavor Concentrates by New Recovery Technique. (4) From Orchard to Cannery—Under Water. (5) At Gerber's Quality Control Reigns Supreme. (6) Bulk Brining Spells Big Benefits to Canner. (7) Top-Notch Tomato Processing Operation. (8) Dual Tomato Cannery—How It Ticks.

6. Book of Flowsheets $2.00

Few copies of 1949 edition still available. It contains 120 process charts covering a wide variety of food manufacturing operations. Charts are accompanied by brief descriptions of the processes.

7. Preventive Maintenance $0.50

An 8-pager packed with information that will help to minimize costs, reduce down-time, and promote quality through more effective maintenance.

1906

Fastest communications system of the times . . . the crank-it-up wall telephone, complete with party line. Engineering at its peak! First Brunner-engineered product was built in 1906.

TODAY — past performance assures a future of promise

GO BRUNNER . . . for dependable Air Conditioning Condensing Units that meet the most exacting food processing requirements.

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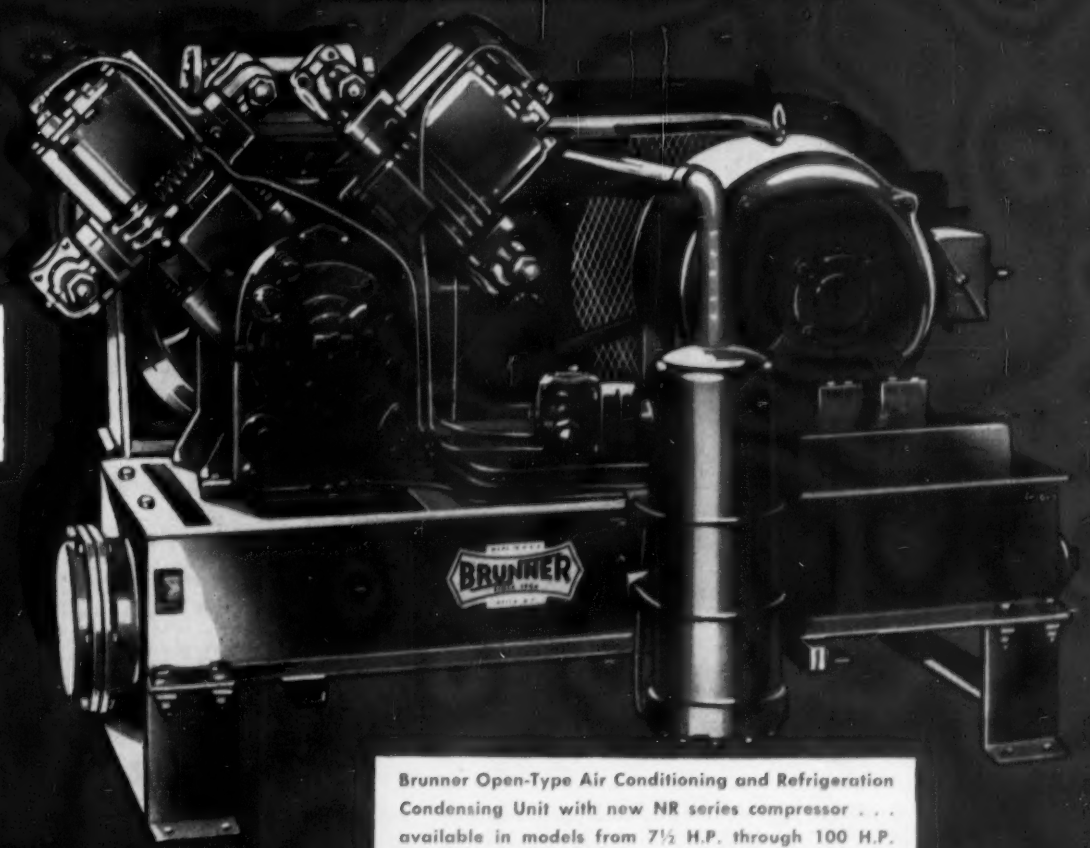
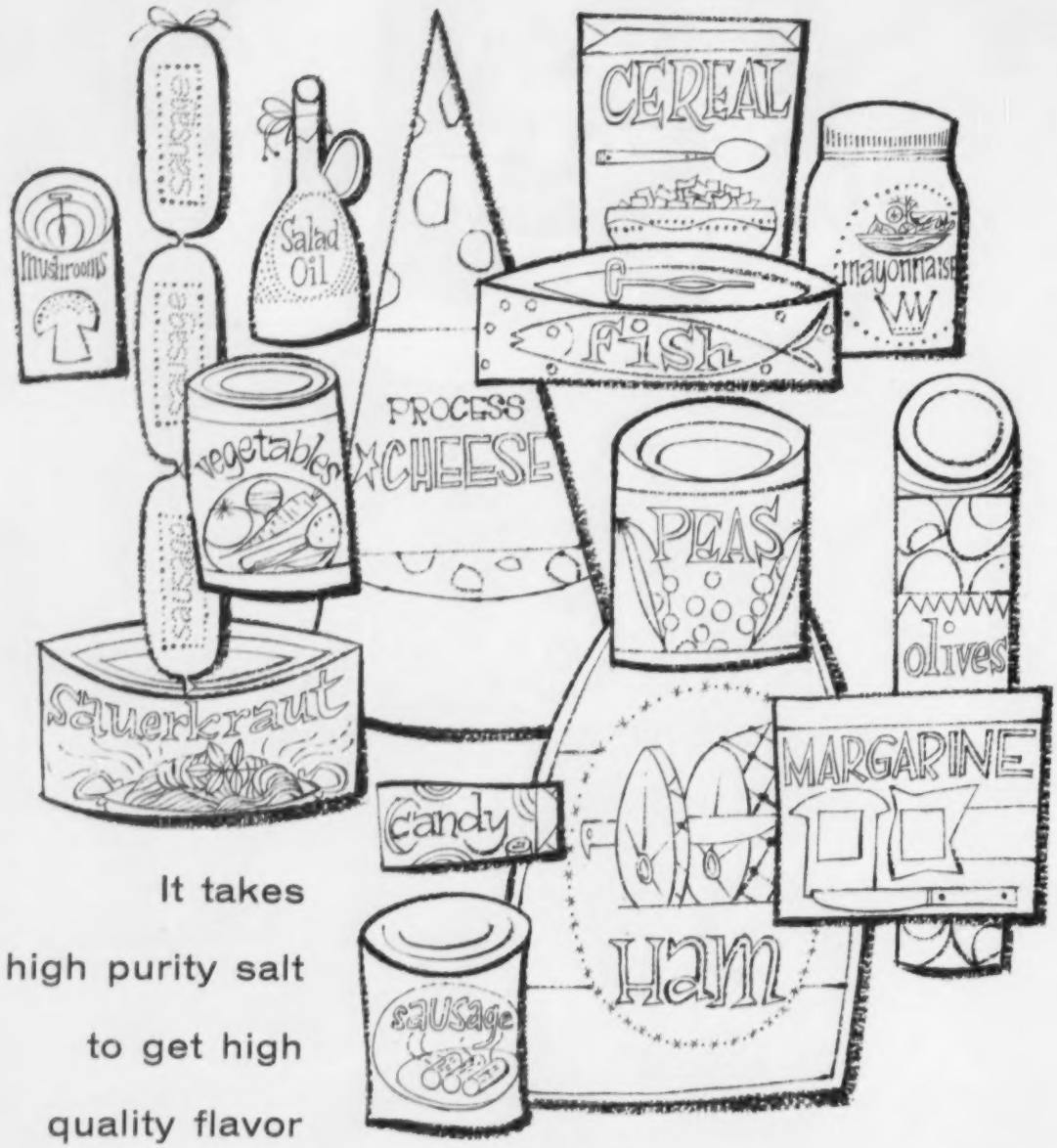


Brunner Open-Type Air Conditioning and Refrigeration Condensing Unit with new NR series compressor . . . available in models from 7½ H.P. through 100 H.P. Commercial units ¼ H.P. through 7½ H.P.



It takes high purity salt to get high quality flavor

Morton '999' Salt

Morton '999' is a high purity salt for processed foods; free from bitter calcium and magnesium compounds that can spoil flavor. '999' is always 99.9% clean, pure sodium chloride, exceptionally low in the objectionable trace metals, copper and iron. With Morton '999', you get a low cost premium grade salt that insures better, more uniform flavor. Morton offers special service and technical help for canners, packers, and food processors. *For more information about Morton '999' Salt, write to:*

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KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

Snag in Bulk Flour Trend

Limited production of special rail cars will definitely slow the trend toward bulk shipment of flour, reports the Millers' National Federation.

To move 75% of all bakery flour (105,000,000 cwt./year) by bulk means, would require 7,749 delivery cars. There are now 910 of these carriers in operation. And not more than 830 new cars will be added to the fleet in 1956.

Main factor in this slow expansion, explains MNF, is cost of the special carriers—$12,000 apiece. To meet the 75%-handling requirement would require a capital outlay of nearly $100,000,000.

New Enricher Revealed

Development of a new, low-fat flour-enrichment concentrate—with protein quality similar to that of meat and milk—is disclosed by Wisconsin Alumni Research Foundation.

This latest fortifier, derived from a combination of grains, contains 10 amino acids considered vital to good health. Hence, product is named V^{10} Protein.

Special Foods Co., Red Wing, Minn., is licensed to manufacture the product. Test marketing of bread containing V^{10} Protein is now underway in South Bend, Ind.

Aims for Edible Fungi

Tank-grown fungi—with the flavor of mushrooms—are aim of experiments now underway at U. of California, Davis.

Raised by a submerged-culture process in large fermentation vats similar to those used in penicillin culture, the edible fungi are thought to have wide application for flavoring "mushroom" soups, gravies, and sauces.

'Radio-Starch' Aids Study

Researchers at U. of California, Davis, are making use of a radioactive tool to aid studies of corn syrup penetration in canned peaches.

To find out how the corn product starches move from peach to syrup and vice-versa, scientists add radioactive, tobacco-leaf starches, similar to those in corn, to the syrup.

Poultry Men Look Into the Future

"Ideas-Action-Progress-Income" was the 4-word theme highlighting the recent Institute of American Poultry Industries' 27th Annual Fact Finding Conference in Kansas City, Mo.

Subjects which got top billing were mechanization, quality and convenience, packaging, stabilization of yolk solids, hormone-fed birds, and a new poultry buying system. Here are capsule briefs from the talks:

► **Mechanization:** To gage how much labor-saving devices are really worth, said H. E. Drews, consultant, Chicago, plant officials should take into account not only direct wage savings, but also fringe benefits—such as social-security costs, unemployment insurance, vacations, and added liability insurance.

These semi-hidden figures often amount to a big 30-60% of direct wage costs.

Other values—increased capacity, elimination of bottlenecks, and more uniform products—added to the scale may show that a plant can well afford a sizable investment in equipment improvements, Mr. Drews concluded.

► **Quality:** "Finding out why some (processed) birds come out tough and others tender is the No. 1 problem in poultry processing research," declared G. F. Stewart, U. of California, Davis.

One answer may be to tenderize fowl in the same way as beef. A turkey cooked right after it's killed will be tough. If it is held 4 hr., it is reasonably tender. By 12 hr., it is quite tender. After 24 hr., it's as tender as it will get. And freezing in itself, says Mr. Stewart, has nothing to do with tenderness. Nor does frozen storage make birds tender.

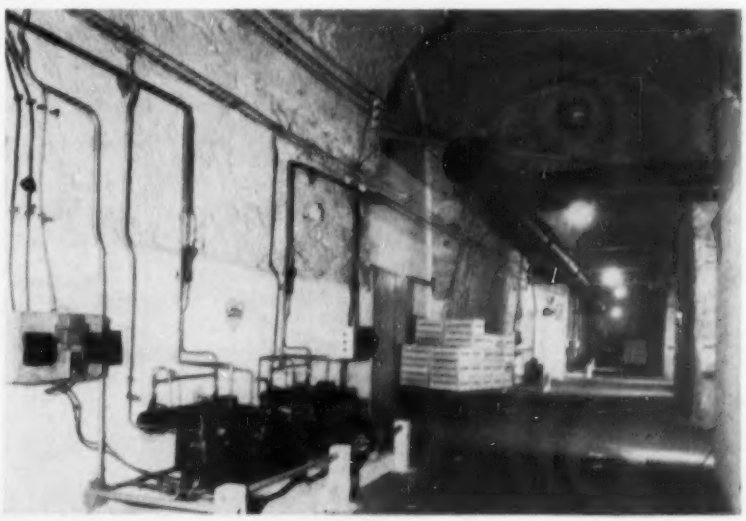
This is a problem in pre-stuffing and freezing turkeys. For, if the housewife must allow a day's thawing time for tenderizing the bird, much of the convenience factor is lost.

Thus, aging must be done in the plant, he asserts. Simplest way is to leave birds overnight in ice, then freeze.

► **Packaging:** A good package for chilled poultry has not yet been developed, charged Robert T. Shockley, Marathon Corp., Menasha, Wis.

Present tray-packs, used by supermarkets, are a stop-gap solution not suitable for processor-packing. They waste space, become stained, are dif-

(*Continued in 3rd column, next page*)



Solves Underground Storage Problem

Three miles of tunnels in an abandoned chalk mine are now being utilized for fruit and vegetable storage by Wholesale Fruit Cooperative Society, Paris, France. Ten, individually-controlled 3-hp. compressors (Frigidaire) have solved the difficult problem of holding temperature in the 282,512-cu.-ft. space to 36 F. Large ventilation ducts (as at center) assure complete air renewal every 45 min.

New Dual-Film Plastic Package Sparks Food Quality and Convenience

A heat-and-cold resistant pouch package—formed by a wedding of Mylar and polyethylene films—offers new convenience and display advantages for heat-and-eat food products.

The unique plastic bag employs a special adhesive, developed by the Flex-Vac Div. of Standard Packaging Corp. So persistent is this bonding material, that the laminated films resist even eight hours of continuous boiling. And the adhesive is said to take low temperatures equally well—retaining its full strength at —80 F. freezing temperatures.

Experiments have been performed with a wide variety of foods to gage quality-retention advantages of this latest package. Soups, sauces, stews, sea foods, frankfurters, and vegetables have all been tested. In every case, products reached the table with their fresh flavors, nutritional values, and weights unchanged.

Other features: Bags take little storage space, either in the plant or kitchen. And they require relatively less equipment than other packaging methods.

Also, vacuum sealing can be used with many products. This produces a package that sinks in water, thus assuring complete submersion of the food during cooking. Fast freezing rates are claimed too, because air-insulation of the product is eliminated.

One of the first applications seen for the new container is in portion-control of foods slated for the institutional trade. Here, the compact packages can offer much greater menu variety with less cost and effort.

"Boil-in-the-Bag" Foods

Pre-cooked or fresh frozen products, packed in a new, laminated film, retain full weight and flavor during cooking. To prepare, sealed foods are merely dropped into boiling water.

"Slip-ons" Guard Cartons

A new method for protecting palletized cases during shipping is now being tested by Alexander H. Kerr & Co., Los Angeles. Cartons are covered with rectangular, polyethylene slip covers that not only shield the loads from dust and rain, but stop scuffing too. Company officials believe that the new plastic sleeves will also yield additional savings in time and labor.

Canning Sanitation Studied

New emphasis on sanitary standards in construction and operation of canning equipment is aim of a project lanuched jointly by National Canners Assn. and Canning Equipment & Suppliers Assn.

Both organizations have now appointed formal committees to select subjects and guide task groups working on each project.

The committees will replace the volunteer groups, organized in 1954, which worked out standards for drum-type blanchers and conveyors.

Seeks Pacific Truck-Ships

Permission to operate two van-carrying ships between San Francisco and Los Angeles is being sought by Pacific Trailer Ships, San Francisco.

The sea-going "piggy-back" service would move on an 18-hour schedule between the two ports, with a ship leaving each port six nights a week.

Proposed capacity of the 3-deck carriers is 288 35-ft. truck trailers.

Food Consumption to Rise Says AMS in '56 Survey

Consumer food expenditures in 1956 are expected to soar even higher than '55 figures, reveals USDA's Agricultural Marketing Service (AMS).

This climb will reflect not only a small increase in consumption, but more, a continuing trend to highly-processed foods, says AMS.

On consumption side, the Service estimates increased per capita use of beef, pork, chicken meat, fluid milk, processed vegetables, vegetable oils, and salad dressings.

Butter and other manufactured dairy products, eggs, turkey meat, lard, shortening, margarine, and frozen fruits and juices are expected to equal last year's figures.

A small decline is predicted for veal, lamb, mutton, canned fruit products, and cereal foods.

Poultry Men (Cont'd)

ficult to pack in shipping containers, and stack poorly in self-service cabinets.

► **Stabilized yolk solids:** A new development may boom use of egg solids in cake mixes, revealed Alex V. Cham, Midwest Produce Co., Ltd., Winnipeg.

Now applied, is the glucose oxidase-catalase system. It stabilizes yolk solids right in the cake mix, thus preventing development of yolk rancidity. However, this technique requires a special packaging method, which is now undergoing shelf-life evaluation.

► **Hormone-fed birds:** Rations fortified with dienestrol diacetate (an estrogenic hormone) improve poultry bloom and weights, reported H. W. Swanson, White Laboratories, Inc., Kenilworth, N. J.

Birds fed this special ration for three weeks prior to slaughtering increased their average weights about 3%. Yield was upped 3% too, because of better feed conversion.

► **New poultry buying system:** Last season, processors in Iowa and Minnesota bought turkeys on eviscerated weights and grades, said Len R. Sullivan, Altura Rex Turkeys, Inc., Altura, Minn.

The unique program entails three new departures: (1) Payments are based on USDA Grades; (2) grade and inspection certificates showing grades and weights accompany each settlement; and (3) market reports are based on eviscerated weights and grades.

With this system, says Mr. Sullivan, quality producers are not penalized for poor quality birds.

Gott Views Candy Future

Outlook for candy manufacturing is fewer plants, greater productivity per man hour, and a wide assortment of new products, asserts Philip P. Gott, president, National Confectioners' Assn.

Total number of candy plants in 1947 was 1,686. Today there are 1,141. President Gott predicts that this downward trend will continue, at least through 1960.

But, between 1939 and 1951, candy production rose 61% while man hours gained only 31%. With the new processes, production methods, and packaging equipment now being developed, this ratio is sure to increase, he adds.

Similarly, advanced processing techniques have widened the range of raw materials used in candies. And new products will make increased use of dairy, nut, and fruit ingredients.

Hors d'Oeuvres

▶ **Because new foods are likely to be tomorrow's best sellers, one southern supermarket chain has made room for the many new products now coming on the market. It did this by virtually excluding non-food items. What a radical move!**

▶ Swiss packaging researchers reveal that one out of every three women grocery shoppers should wear glasses, but doesn't. Seems a lot of ladies get a dim view of label designs.

▶ **Many statistics prove the selling power of good packages. Still, after a product is out of the package, it is strictly on its own.**

▶ The Langer Bill in the Senate would ban interstate commerce in advertising of beer and other alcoholic beverages. 'Tis the bill to make Milwaukee famished.

▶ **Americans in '54 spent more for beer and hard liquor ($4.9 and $4.3 billion) than for dairy products (9 billion). Milk makes them healthy, but maybe alcohol makes them feel good faster.**

▶ A promotion genius has invented a pencil with a lollypop where the eraser should be. Just the thing for pencil chewers.

▶ **At the age of 57, after repeated failure, and on borrowed money, Gail Borden rang the success gong with condensed milk. Something to reflect upon in discouraging moments.**

▶ Garlic consumption in the U. S. is nine times greater than it was 25 years ago. That's progress?

▶ **Laborers who built the Great Pyramid in Giza are said to have subsisted largely on onions and garlic. Now we know the force that moved the huge stones.**

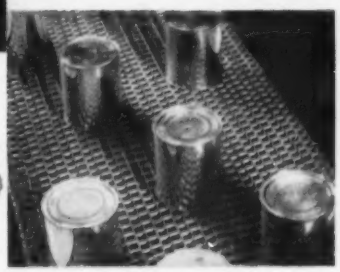
▶ Roman soldiers are alleged to have eaten garlic before going into battle. They had a secret weapon.

Low in cost . . . Long on service

LA PORTE

FLEXIBLE STEEL

CONVEYOR BELTING



Here's your answer to rising food handling costs! La Porte's original cost is less than comparable types.

Maintenance is no problem—open mesh feature makes it easy to sterilize with steam or scalding water while in motion. Simple interlocking construction for fast, inexpensive replacement of any number of sections. Less downtime.

And in performance, versatile La Porte really shines! FLEXIBILITY knocks out creep, weave, jump and slippage. Provides smoother, perfectly flat surface for moving products or containers.

Better specify LA PORTE—the belt that costs less, lasts longer!

LA PORTE

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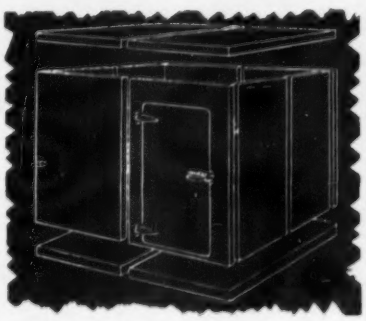
MAT AND MFG. CO.

BOX 124 ***La Porte, Indiana***

FREEZER AND COOLER THAT ARE EXPANDABLE PORTABLE



GREATEST FLEXIBILITY—By arranging combinations of only a few standard size armorply panels, a cooler room, frozen food storage room, freezing tunnel or similar installation can be made to fit virtually any specification and floor plan. By inserting or removing panels, FBD Walk-Ins can be increased or decreased in size easily and quickly—or the entire room may be disassembled and moved. Any number of doors of any type may be located in any position—or relocated later, if desired. Using panels of varying insulation thickness for walls, partitions, etc., dual temperature rooms may be assembled.

NO EXTERIOR BUILDING NEEDED—A concrete slab, a shelter roof and an FBD Modular Panel Walk-In is all you need for the most modern, lowest cost refrigerated warehouse. You can completely eliminate the usual massive, expensive structure. The sturdy modular panels of your FBD Walk-In form insulated walls, ceiling and floors that will shrug off the strongest winds and most severe weather conditions.

WHAT IS ARMORPLY — Aluminum or stainless steel skin bonded to waterproof plywood. In refrigeration equipment, metal skin provides 100% vaporproof barrier, reflective insulation, easy to clean, needs no painting, will not absorb odors, meets all sanitation codes. Plywood backing provides rigidity and impact strength.

FREEZER BOX DIVISION

Annapolis Yacht Yard, Inc.

Box 791 • Telephone: Colonial 3-2381

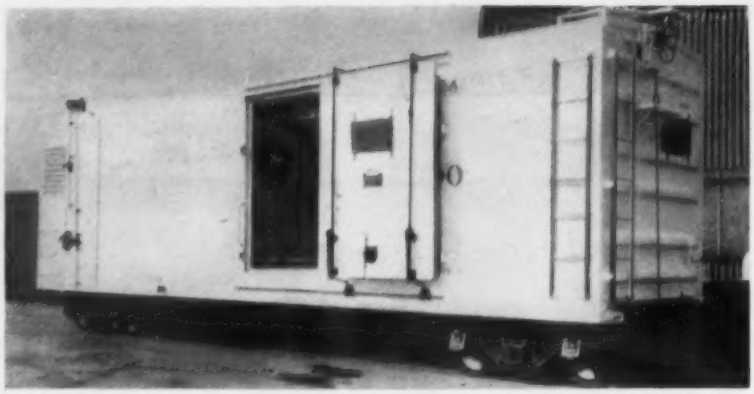
1700 West Street • Annapolis, Maryland

Fish Imports for '55 Show Slight Net Gain

U. S. imports of frozen and canned tuna, swordfish, canned salmon, and shellfish showed a sharp, 43,000,000-lb. gain in '55, declares Fish & Wildlife Service. In contrast, imports of groundfish fillets, canned sardines, and fresh and frozen salmon declined from '54 figures by some 40,100,000 lb. Thus, overall gain was less than 3,000,000 lb.

Here's breakdown on gainers: Frozen tuna, 145,200,000 lb. (up 21,500,000 lb.); canned tuna, 34,700,000 lb. (4,300,000 lb.); swordfish, 18,700,000 lb. (2,200,000 lb.); canned salmon, 13,000,000 lb. (1,600,000 lb.); and shellfish (shrimp, lobsters, and crabmeat), 108,400,000 lb. (19,400,000 lb.)

On the down side: Groundfish fillets, 128,300,000 lb. (down 9,200,000 lb.); canned sardines (with and without oil), 20,800,000 lb. (14,200,000 lb.); and fresh and frozen salmon, 16,900,000 lb. (16,000,000 lb.).



New Reefer Beats 125-deg. Desert Heat

Frozen foods have now been successfully transported across burning Arabian desert sands in a new, mechanically-refrigerated rail car, made by a Brussels associate of Gregg Co. Ltd., New York City. Unit is equipped with two separate refrigeration systems (Worthington). Each of the 2-stage, 7½ hp. compressors is rated for 50% of needed capacity. Power is supplied by a single, diesel electric generator. Sheet aluminum vapor barriers and 8-10 in. of glass fiber insulation seal out the 125-deg. heat.

Poultry Men Name Officers

Dr. Cliff D. Carpenter has been named president of the Institute of American Poultry Industries for the 12th consecutive year.

Other 1956 officers are: O. Youngblood, Waco, Tex., 1st vice-chairman; C. W. Frank, Sr., New Orleans, 2nd v.-c.; D. K. Howe, Omaha, 3rd v.-c.; W. F. Priebe, Jr., Chicago, secretary-treasurer; and C. W. Pratt, Chicago, asst. secretary-treasurer.

ICC OK's New Rate Hike

Boosts of up to 6% in basic railroad freight rates have been approved by the ICC, effective March 7, 1956.

Under the new schedule, carload shipments of canned and preserved food products are subject to a maximum rise of 6c. per 100 lb. Sugar, grains, livestock, fresh meats, and packinghouse products are held to a 5% increase.

Kit Released for FDA Fetes

Preparation of 50th anniversary celebrations for the Federal Pure Food Law is aided by a work kit, distributed to organizations and individuals at cost by Food Industries Committee of the Assn. of Food & Drug Officials of the U. S.

Kit contains historical and other background material on the 1906 Law, plus special anniversary seals and promotional suggestions. Orders are placed with the 50th Anniversary Information Center, Suite 505, 1145 19th St., N. W., Washington, D. C.

Dack Wins Nutrition Honor

Dr. Gail M. Dack, head of U. of Chicago's Food Research Institute, is 1956 winner of the Babcock-Hart Award, announces IFT. The prize, donated by Nutrition Foundation, Inc., will be presented June 11 during the IFT annual in St. Louis.

A pioneer in the study of food organisms, Dr. Dack is author of the standard book on health hazards, *Food Poisoning*.

Plastic 'Puffed' Into Tubes

A new method for producing seamless tubes from a single sheet of plastic is disclosed by Walter Opavski, a Coburg, Germany, firm.

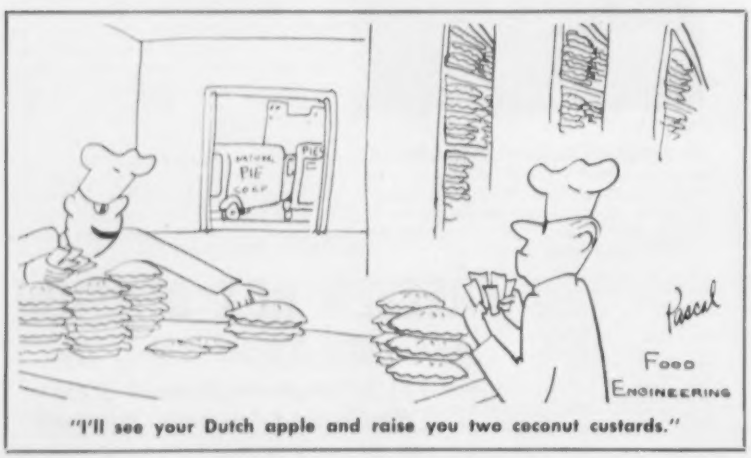
Process involves soaking plastic plates in a swelling agent, then subjecting them to heat. High temperature hardens plate surface and turns entrapped, swelling-chemicals into gases that 'puff' sheet into a tube.

Report states method saves up to 50% on labor and materials costs.

Bakery Engineers Elect

Officers of the American Society of Bakery Engineers for '56, elected at the recent annual meeting in Chicago, are as follows:

President, A. G. Hackett, Drake Bakeries, Inc., Brooklyn, N. Y.; 1st v.-p., H. M. Freund, Freund Bread Co., St. Louis; 2nd v.-p., I. M. Franzen, Standard Brands, Inc., Chicago; 3rd v.-p., A. F. Reising, Sunrise Bakery, Inc., New Orleans; sec.-treas., V. E. Marx, American Society of Bakery Engineers, Chicago.



"I'll see your Dutch apple and raise you two coconut custards."

Vive La Vanillin!

Rapid solution rate and rich vanilla flavor make it outstanding for food products

Whether it's wild cheering or silent approval is immaterial—the fact remains that a lot of nice things are being said about Vanillin, U.S.P., a highly effective Dow aromatic.

Vanillin simulates *the vanilla bean* in its full richness of flavor—as customer reports and panel tests indicate strongly. Produced by a unique process, Dow Vanillin has excellent light stability. Add to that a very fast rate of solution and you have an extremely effective food flavor additive.

Better flavor means more sales—and that's where *you* come in! You can give your food products more sales-appeal by specifying Vanillin, U.S.P. Want to see its effectiveness firsthand? You can very easily by requesting, on your letterhead, samples and further information from THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. AR 872D.

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DOW

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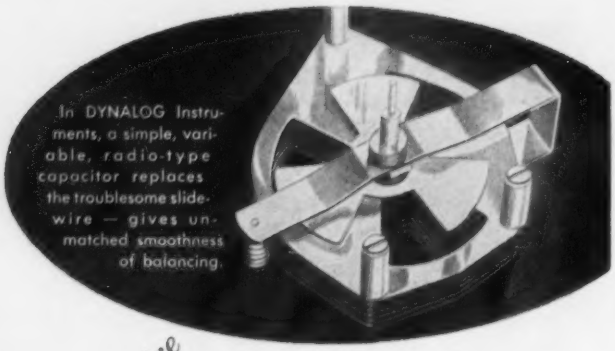
In DYNALOG Instruments, a simple, variable, radio-type capacitor replaces the troublesome slidewire — gives unmatched smoothness of balancing.

This potentiometer has no slidewire

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ELIMINATES SLIDEWIRE MAINTENANCE

DYNALOG'S* EXCLUSIVE BALANCING ACTION

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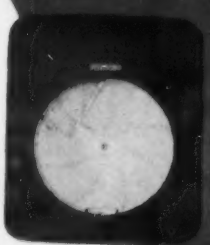

There's no need to put up with worn slidewires and sticking electrical contacts . . . no need to periodically clean and lubricate balancing motors. DYNALOG design eliminates all this! Its simple variable capacitor and positive magnetic drive provide *continuous, stepless* balancing . . . *never* require attention!

DYNALOG's friction-free action provides high speed of response without wear. (There are only five moving parts, including the recording pen!) Sensitivity, unlimited by turns of slidewire winding, is 1/100 of 1%. And accuracy is a sustained 1/4 of 1%.

DYNALOG Instruments are available for use with resistance, voltage, capacity, or inductive type primary elements to measure and/or control any process variable . . . with unmatched smoothness. Write for Bulletin 427. The Foxboro Company, 304 Neponset Ave., Foxboro, Mass., U.S.A.

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DYNALOG
ELECTRONIC INSTRUMENTS

"Dogpatch" Ham

A special curing and smoking process has been developed by Reliable Packing Co., Chicago, to preserve giant "buffalo" hams —obtained from only one or two hogs in a thousand. Method is speedier than old-style long brine soaking and smoking, yet is unlike today's "quick-cure" techniques. This ham weighed 60 lb. before going into the smokehouse.

USDA-NCA Joint Goal: Better, Low-Cost Candies

Higher-quality, lower-cost candies are resulting from experiments with various sugars, milk solids, and slab dressings, announces USDA.

Working jointly with National Confectioners' Assn., the Southern Utilization Research Lab reveals that excellent colored candies, can be made from low-cost turbinado sugar, which requires no carbon refinement.

Clear and white products are best produced with ion exchange sugar (to date, only experimentally produced).

These candy products differ only slightly in color from products made with regular granulated sugar.

With dairy products: Sweetened condensed whey, dry sweet whey, and a combination of sweetened condensed whey and dried sweet-cream buttermilk have all been used to make caramels. A maximum of 13% whey solids was successful in trial batches.

Several chemicals the scientists found useful as slab dressings in making hard candies were: Butyl and ethyl stearates, ethyl palmitate, ethyl esters from cottonseed oil, and acetoglycerides. All gave good lubrication without rancidity.

14,000 GALLONS OF MILK PER DAY

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Do as Expert Dairy, be sure the equipment you buy is Viking equipped. It's built to handle all types of liquid and semi-solid food products. Send today for catalog Fe.

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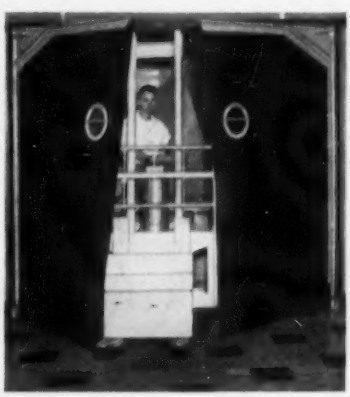
The Original "GEAR-WITHIN-A-GEAR" Rotary Pump

CANDOR RUBBER DOORS

are really FLEXIBLE ... the perfect bumper door



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CAN STAND THE 'ROCK 'N ROLL' TYPE OF TRAFFIC. Now in use in numerous industries:— Refrigeration — Cold Storage — Meat Packing — Food Processing — Textile — Paper, etc. Rubber sheets are specially treated for low-temperature applications.

DESIGNED AND BUILT TO PRECISE OPENING DIMENSIONS with slight center overlap for the rubber sheets. Maintain room temperatures; avoid loss of conditioned air; protect against humidity, heat, costly delays, and constant repairs to rigid swinging doors.

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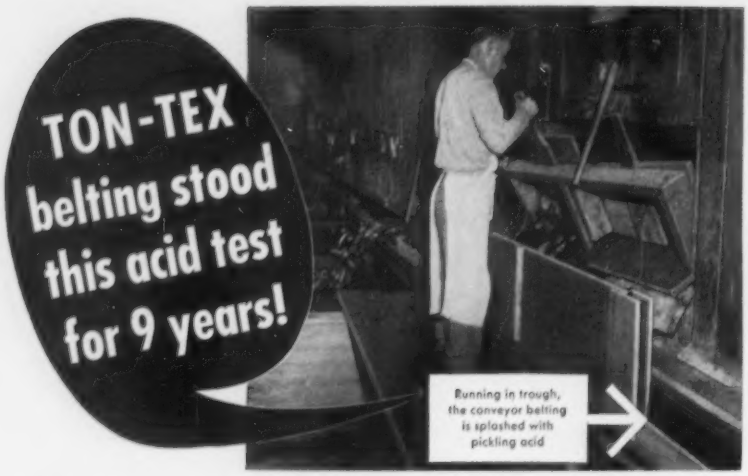

This pickle plant found there's a difference in acid-resisting conveyor belts. They tried many types to convey pickles to tanks, but acid soon ended their usefulness. Then they tried a Ton-Tex belt of tightly woven plies of cotton specially treated. *That belt stood the acid test for 9 years!* A similar Ton-Tex belt then replaced it. If you process or can foods, Ton-Tex belting can cut conveying costs. Let our engineers help select the *right* belt for your job.

● **Conveying costs increased by moisture, heat, acids, oils? Ton-Tex belts will solve your problem . . . save money!**

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Briefly . . .

● **FROZEN BAKERY PRODUCTS will be studied by the American Institute of Baking as a result of a contract awarded by the USDA. Research is aimed at finding best freezing conditions for these sweet goods.**

● MEAT PRODUCTION for the first 10 weeks of '56 stands at 4.4-billion lb., up 13% from the same period in '55, states American Meat Institute.

● **STRONGEST PACKAGING TREND is toward giant-sized boxes and multi-packs, says the Folding Paper Box Assn., after surveying 307 food and grocery companies.**

● NEW FLAVOR LABORATORY will be built this spring by Arthur D. Little, Inc., Cambridge, Mass. The 3-story building will house greatly increased facilities for research in taste testing, food technology, and bacteriology.

● **VENDING MACHINES for bottle and cup-type soft drinks boomed in '55, according to Vend magazine. The cup dispensers now total 63,400 units, up 12,700 since '54. Bottle machines rose to 646,000, an increase of 66,000.**

● FOOD TECHNOLOGISTS are introduced to interested industry men through a novel brochure, distributed by Oregon State College. Education, experience, and activities of each graduate are listed with their pictures.

● **PROMINENT EXHIBITORS at the Better Food Exhibition, recently held in Melbourne, Australia, were H. J. Heinz Pty., Ltd. and Kraft Foods. Heinz has opened a large new plant at Dandenong, Victoria. Kraft, likewise, will be in operation there soon. Further show highlights were food lines featuring FMC processing units made by Food Machinery Australia Ltd.**

Action on Standards

Following actions have been taken by the Agricultural Marketing Service (AMS) and Food & Drug Administration (FDA) on U. S. Standards and allowable tolerances of various pesticides on raw agricultural commodities. References are to *Federal Register*.

Grapefruit juice, dehydrated, AMS proposed U. S. Grade Standards, *F.R.*, Feb. 16, p. 1065.

Grape juice concentrate, frozen, AMS proposed U. S. Grade Standards, *F.R.*, Feb. 25, p. 1274.

Fruit preserves (or jams), proposed amended U. S. Grade Standards, *F.R.*, Mar. 6, p. 1451.

Carcass beef, proposed amended U. S. Grade Standards, *F.R.*, Mar. 8, p. 1481.

Beans, proposed revision of U. S. Standards, *F.R.*, Mar. 10, p. 1530.

On corn, barley, buckwheat, rice, rye, and wheat, tolerances of pip-

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ON Century's NEW SMALLER, BETTER MOTORS 1 TO 30 H.P.

In this revealing book, Century shows how and why the *New Standard*, smaller motors actually outperform the larger, heavier Old Standard models.

These trim, compact "*New Standards*" give you weight savings up to 40% . . . plus space savings and easier installation. Dead weight and dead air space are eliminated. The "active materials," such as iron and copper, are designed to give greater efficiency than ever before. New synthetic insulating materials give greater dielectric strength and uniformity.

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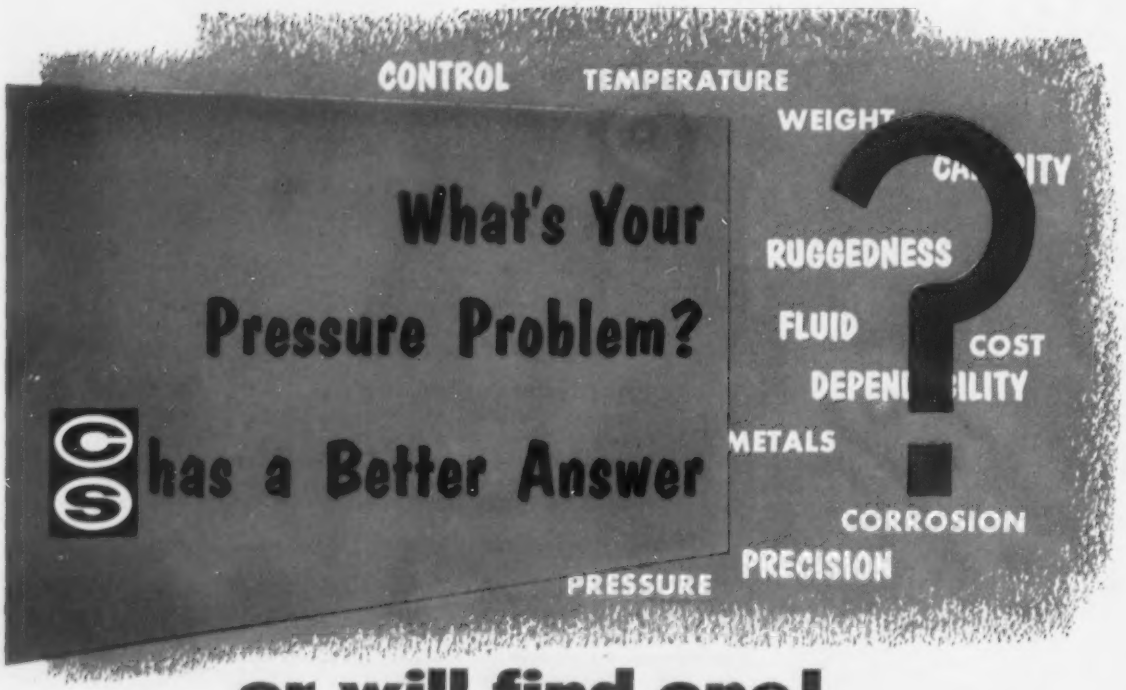
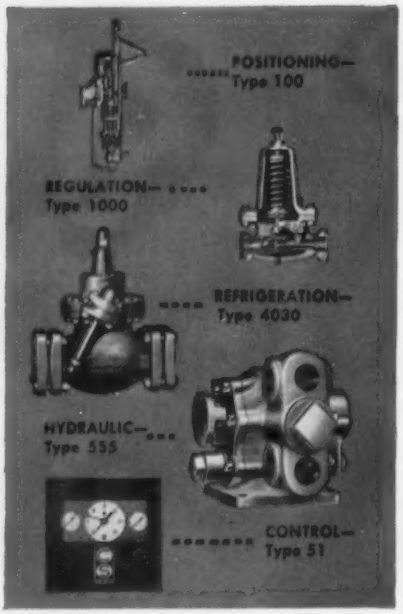


or will find one!

Finding or developing answers that *best suit* individual pressure probiems has been Cash Standard's specialty for over a quarter of a century. The solution to *your* problem can be found either in the established Cash Standard line of pressure regulators, instruments and automatic controls, or in Cash Standard's willingness to tackle problems—to modify existing products or design new products to conform precisely to your needs.

For an individual solution to *your* pressure problem, contact the Cash Standard pressure specialist in your area, or write for pressure problem analysis.

Some Applications Served by Cash Standard Pressure Products



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CASH STANDARD

A. W. CASH COMPANY, P. O. Box 551, Decatur, Illinois

Pressure, Hydraulic, Temperature, Process and Combustion Controls

cronyl butoxide and pyrethrins, *F.R.*, Feb. 15, p. 1047.

On almonds, barley, beans (dried), cashews, cocoa beans, corn, peanuts, peas (dried), pecans, popcorn, rice, rye, walnuts, and wheat, tolerances of hydrogen cyanide, *F.R.*, Feb. 21, p. 1172.

On oranges, lemons, grapefruit, tangerines, limes, tangelos, citrus citron, and kumquats, tolerances of sodium o-phenylphenate, *F.R.*, Feb. 21, p. 1172.

On cabbage, cottonseed, cucumbers, eggplant, peppers, potatoes, sugar beets, sugar beet tops, summer squash, and tomatoes, tolerances of Endrin, *F.R.*, Mar. 1, p. 1348.

On apples, tolerance of Endrin, *F.R.*, Mar. 3, p. 1416.

On mushrooms, tolerance of Lindane, *F.R.*, Mar. 3, p. 1417.

On pears, exemption from tolerances of basic copper carbonate, *F.R.*, Feb. 21, p. 1187.

On grapes, proposed tolerances of 3-(p-chlorophenyl)-1, 1-dimethylurea; *on potatoes*, of 3-(3, 4-dichlorophenyl)-1, 1-dimethylurea, *F.R.*, Mar. 10, p. 1543.

Samsoe cheese, Standards of Identity, *F.R.*, Mar. 6, 1956, p. 1440.

Tea, Standards, *F.R.*, Feb. 29, p. 1317.

Cheeses, processed cheeses, cheese foods, cheese spreads, and related foods, amendments of Standards of Identity, *F.R.*, Feb. 25, p. 1269.

On copra, statement of policy for ethylene oxide residues, *F.R.*, Feb. 21, p. 1172.

Prune juice, canned, Standards of Identity, *F.R.*, Feb. 17, p. 1095.

Schedule of Events

April

16–20—Plant Layout Technical Workshop, planning techniques, (second session 23-27); Greater Pittsburgh Airport Hotel, Pittsburgh.

18—American Sanitation Institute, one-day food and beverage sanitation clinic, Northwestern U., Chicago.

18–19—Armour Research Foundation, industrial research conference; Sherman Hotel, Chicago.

19–20—American Dry Milk Institute, annual meeting; Edgewater Beach Hotel, Chicago.

23–25—American Oil Chemists' Society, spring meeting; Shamrock Hotel, Houston, Tex.

23–26—3A Sanitary Standards Committees for Dairy Equipment, semi-annual meeting; Kenwood Golf & Country Club, Bethesda, Md.

26–27—Pennsylvania Manufacturing Confectioners' Assn., annual production conference; Franklin & Marshall College, Lancaster, Pa.

26–27—American Institute of Electrical Engineers, conference on recording & controlling instruments; Bradford Hotel, Boston.

26–27—Society for Advancement of Manage-

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Don't let valuable product go up your stack when you can bag it for profit! Need proof of this statement? Dustex can give it to you with the simple test equipment illustrated which gives accurate figures on efficiencies, hourly collection rate and stack losses, if any, to be expected after installation of Dustex Collectors. This test is run without shutdown or interference to production and gives you the facts as they apply to your individual operation.

Used throughout the food and chemical industries for the dry collection of fines without filter media, Dustex Collectors are operating with efficiencies of 99.5%+ on a diversified list of products ranging from spray dried coffee to polyvinyl chloride. For proof on how you can bag more profit — request a copy of our Determination Test booklet.

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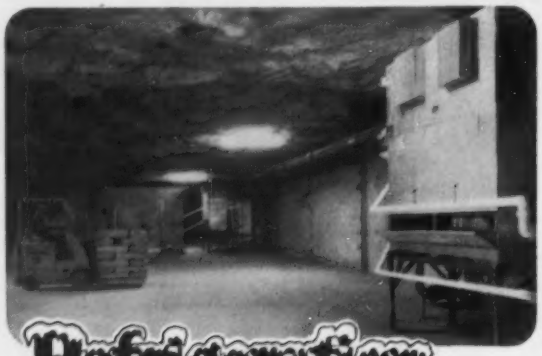

The Inland Cold Storage, Inc., at Kansas City, is remarkable in many ways. Here over a hundred acres of dry space in a former limestone quarry are available. Three million cubic feet are already refrigerated. Quick-freezing capacity is 60,000 lb. per day; freezer storages hold 1200 carloads, and fresh-produce rooms another 300 carloads.

Five Frick "ECLIPSE" ammonia compressors and 40 Frick air cooling units, among other equipment, supply refrigeration to the huge rooms through the medium of cold brine.

The *important* jobs call for Frick Equipment. Let us quote on the cooling equipment you need—whether for air conditioning, quick-freezing, ice making, or other refrigerating work.

Frick "ECLIPSE" compressors at Inland Cold Storage

FRICK CO. WAYNESBORO, PENNA. U.S.A.

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Should your present processing belt system be unsatisfactory, or if you plan installing a belt system in the future, *be sure to check into Cyclone Processing Belts.* Our belts are available in carbon, alloy and Stainless Steels in *many* designs and sizes. Cyclone Belt production lines are famous for smooth operation and long service with minimum maintenance. Find out how a Cyclone Processing Belt can smooth out your production worries. Send for our fully illustrated catalog No. 5. There's no obligation for this wealth of information.

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UNITED STATES STEEL

ment, management engineering conference; Hotel Statler, New York City.

27–28—National Pretzel Institute, spring convention; Bedford Springs Hotel, Bedford, Pa.

May

6–10—Assn. of Operative Millers, annual technical conference & trade show; Statler-Hilton Hotel, Dallas, Tex.

6–10—American Society of Brewing Chemists, annual meeting; Chase Hotel, St. Louis.

9–11—American Material Handling Society, western material handling show; Western Livestock Exhibition Auditorium, Los Angeles.

11–12—National Fruit & Syrup Mfrs. Assn., annual convention; Traymore Hotel, Atlantic City.

12–15—National Independent Meat Packers Assn., annual meeting; Palmer House, Chicago.

13–16—Flavoring Extract Mfrs. Assn., annual meeting; Traymore Hotel, Atlantic City.

14–16—Biscuit & Cracker Mfrs. Assn., annual meeting and conference; Hotel Plaza, New York City.

15–16—Armour Research Foundation and Nucleonics, industrial nuclear technology conference; Museum of Science & Industry, Chicago.

20–24—American Assn. of Cereal Chemists, annual meeting; Commodore Hotel, New York City.

Packer's Ingenuity

—*Continued from page 77*

through a nozzle into blower discharge stream.

Smoke, steam, and dry-heated air are all equally proportioned to the two house ducts by another damper, located at the point where the main duct from the heater divides. This motor-driven "flapper" oscillates back and forth—directing gases into first one duct, then the other.

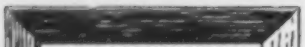
For positive performance, damper is actuated through an eccentric crank that can be quickly hand-adjusted to change damper speed.

All smokehouse functions (except showering) are controlled from a central gage board by air-operated valves. Here, switches set conditions for dry heating, smoking, steam cooking, or fresh-air exhausting. Once set, operation is automatically maintained.

Each house is equipped with wet- and dry-bulb thermometers that couple to a two-pen, controller-recorder on the gage board. This device enables accurate maintenance of proper heat and humidity conditions.

How Smokehouses Are Used

For a product such as frankfurters, operation of smokehouses starts with all dampers closed. A switch on the gage board is turned to dry heat, and steam is admitted to heating-unit coils. Large blower starts and circulates hot air through the house for 15 min.



This raises the temperature to 130 F.

Using Salt Efficiently

by **INTERNATIONAL SALT COMPANY, INC.**—America's largest producer of salt

Unloading Bulk Salt From Boxcars—at Lower Cost

While salt is a relatively low-cost material, handling it often involves considerable expense in time and manpower. Unloading bulk salt from boxcars, for example, has always been one of the problem spots. Today, however, a number of money-saving unloading methods have been developed for large and small plants.

Determining which of these modern salt unloading methods is best for your company depends on the tonnage involved, and specific plant requirements. But you can generally find one which will pay for itself—in savings on time and labor—over a relatively short period. Here is a review of four practical salt unloading methods, and the equipment used in each.

Portable conveyor system. This is the simplest improvement over straight manpower. A power-operated belt conveyor of suitable length is placed inside the car door, and salt is then shoveled onto it. Conveyors may be used to bring salt directly into the plant—or even to storage areas above dock level. A good conveyor for most needs is generally about 16 to 18 feet long and capable of moving salt up a 30° slope. With a conveyor, a good deal of manpower in shoveling is required, but one 40-ton car can be unloaded in about 12 to 14 man-hours—a 19% saving in time over straight manpower.

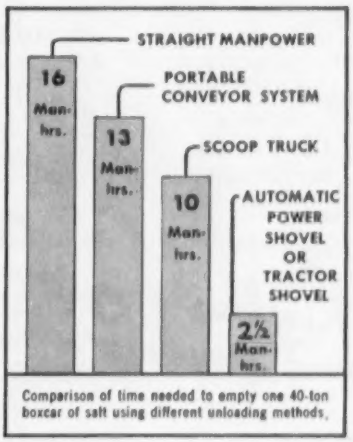
Scoop truck and conveyor. A scoop truck is simply an enlarged scoop shovel with two small wheels at the bowl of the scoop. Whereas a shovel holds only about 20 lb. of salt—a scoop truck holds 100 to 150 lb. In operation, the scoop is pushed into the salt, tilted up, and then wheeled to the conveyor at the car door. With just one of these scoops, a worker can unload 40 tons of salt in 10 hours—and once the job is under way, there is room for two or three more men with scoops. An important point: A good scoop truck costs only about $50.

Automatic power shoveling. This is one of today's most popular methods for unloading bulk salt—and many manufacturers offer excellent power-shovel equipment. Basically, the device consists of a large power-operated scraper blade mounted on a cable. The scraper is moved toward the end of the car, and as soon as this motion stops, a power winch takes hold to drag the scraper toward the car door. Salt is pushed out through the door by the scraper. One man can unload a 40-ton car in 2 or 3 hours by this unique method. Both winch and motor for the power shovel must be permanently mounted on the dock or side of the building—but the installed cost of this equipment is moderate.

Small gasoline or electric tractor shovel, somewhat similar to a fork-lift truck, but with a scoop mounted in place of the forks. Many types are available, some having forks interchangeable with the scoop. One man on this type of truck can empty a 40-ton car in 2 to 3 hours—the equivalent of

power-shovel unloading. The higher cost of a tractor shovel, however, is often justified when it can be made available for other purposes.

Extra savings are possible with tractor shovels with scoop attachments. These



Comparison of time needed to empty one 40-ton boxcar of salt using different unloading methods.

trucks not only move salt out of the boxcar, but also transport it to any point of storage or use within the plant. This eliminates the need for various types of conveying equipment—either on the dock or in the plant. And manpower for handling salt in the plant is considerably reduced.

TECHNICAL SERVICE WITH YOUR SALT

Through skilled and experienced "Salt Specialists," International can help you get greater efficiency and economy from the salt you use. International produces both Sterling Evaporated and Sterling Rock Salt in all grades. And we also make automatic dissolvers in metal or plastic for both types of salt. So we have no reason to recommend one type of salt over another; we simply suggest the type and grade of salt most perfectly suited to your needs.

If you'd like help on any problem concerning salt or brine—or further information on salt unloading—contact your nearest International sales office.

International Salt Company, Scranton, Penna.
Sales offices: Atlanta, Chicago, New Orleans, Baltimore, Boston, Detroit, St. Louis, Newark, Buffalo, New York, Cincinnati, Cleveland, Philadelphia, Pittsburgh, Richmond.

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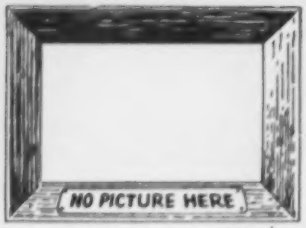

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This raises the temperature to 130 F.

Then, a second switch on board is turned to "open," and smoke valve drains. This allows smoke to enter house. Temperature is progressively raised: First, to 140 F. for 15 min., then to 160 F. for 45 min., and finally to 180 deg.

Franks are finished when internal temperature reaches 142-144 deg. This occurs after about 15 min. at the final temperature. Smoke is recirculated throughout the period by the main blower, and is not exhausted until process is finished.

Smoke is shut off by filling water valve, and house is vented by starting an exhaust fan. Fresh air damper on heating unit is opened to aid this process. It allows main blower to flush house with fresh, room-temperature air.

Steam cook is started by closing exhaust duct and fresh-air damper, and admitting live steam into main blower discharge. Franks are cooked for 10 min. at 180 deg.

After again exhausting house, shower is actuated by a hand-operated lever on the front of the house. Franks are sprayed for 8-10 min. in winter, 12-14 min. in summer. Shorter winter time results from colder water temperature.

Total time for the whole process is about 2 hr.

Clean-up Made Easy

Sanitation in these modern units is made simple, both by the construction of the equipment and through use of an efficient cleaning tool.

The stainless steel ducts have numerous clean-out ports, spaced 4-5 ft. apart. Once a week these sliding panels are opened and workers thoroughly wash inside of ducts with an alkaline detergent (Dyna-Sprex). A clean water wash flushes material out through a drain in the lowest part of the system.

Cleaner is pressure-sprayed onto the dirty surfaces with a pump-supplied spray gun. Pump-motor units are mounted directly on detergent barrels, which are made portable by a caster wheel base.

This apparatus also is used for daily cleaning of wall, ceiling, and floor surfaces in the smokehouses.

End (Resume reading on page 78)

N-M-R New QC Tool

—Continued from page 57

homogenous magnetic field of 1,200 gauss.

Next, a radio transmitter supplied a signal to the sample through the rf coil. Then the sample's absorption

PNEUMATIC

PNEUMATIC SCALE CORPORATION, LTD., Quincy 71, Mass. Also: New York; Chicago; Dallas;

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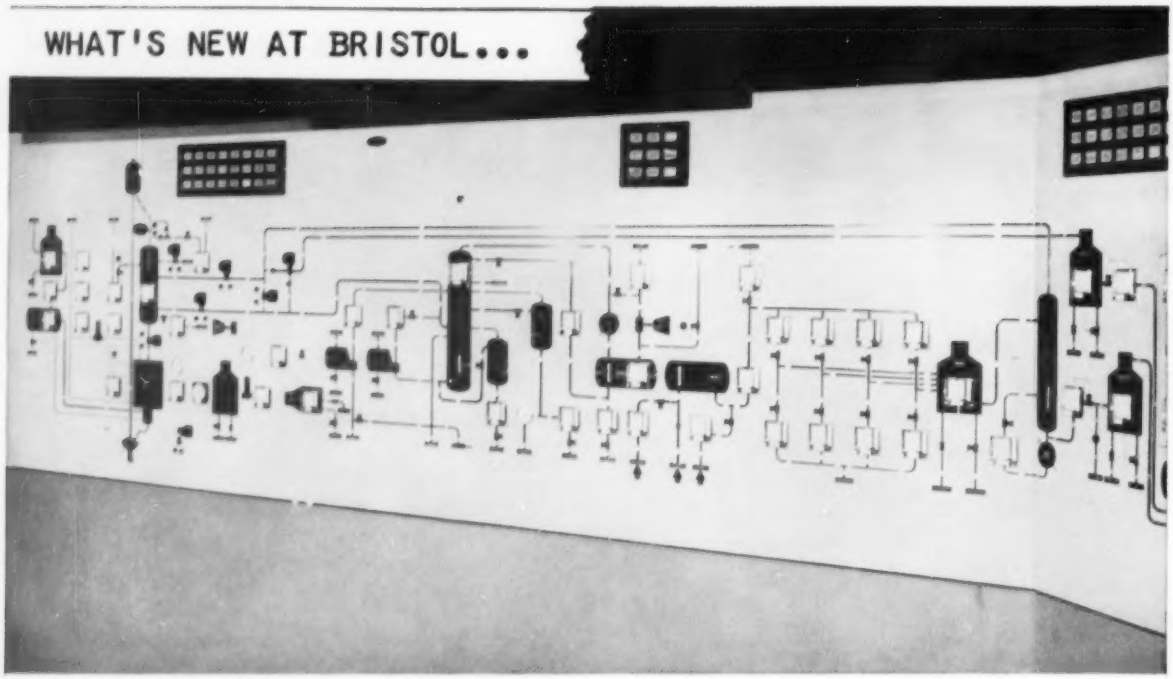
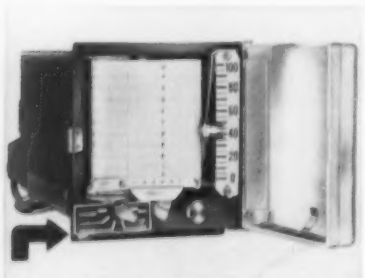
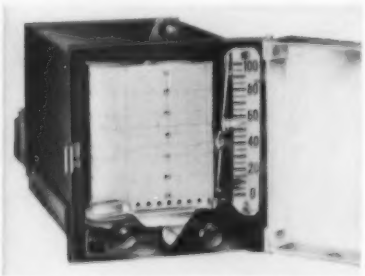
WHAT'S NEW AT BRISTOL...



TYPICAL GRAPHIC PANEL of Bristol Metagraphic instruments.



SIX-POSITION TRANSFER VALVE (on one knob) for cascade control.



THIS METAGRAPHIC TWO-PEN RECORDING RECEIVER records, indicates and controls one variable, and records another. It gives a continuous indication of either set-point or valve-position and indicates the other when valve knob is depressed.

Bristol's Metagraphic Receiver line

gives you 35 models to choose from

A new degree of performance flexibility in a pneumatic receiver

Bristol's Metagraphic Receiver is offered for up to 3 measured variables – choice of three- or six-position transfer valves on one knob.

Full plug-in construction provides a flexibility of use that can't be matched. You can change a recorder to an indicator or vice versa in less than 10 seconds. If trouble is suspected, the unit can be replaced by a spare, checked in the shop – eliminating down time.

The chassis of a Metagraphic Receiver can be withdrawn to an intermediate position while still operating. In this position, receiver can be inspected, charts changed, pens inked, zero adjusted, and clock serviced.

Continuous valve position indication on same scale as set point. "Bumpless" transfer is effected simply by matching pointers – no need to read scales.

High-visibility colored fluorescent paints make pointers easy to tell apart. Pointers for a given function are the same color in all instruments.

Air chart drives are 100% pneumatic – no electricity needed. Operates from 20 psi air supply.

Universal piping manifold can be adapted to any piping (2-pipe or 4-pipe system). No special tools, no parts required.

Write for the Bristol Metagraphic Receiver bulletin. The Bristol Company, 115 Bristol Road, Waterbury 20, Conn. 5.43

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POINTS THE WAY IN HUMAN-ENGINEERED INSTRUMENTATION

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

of the signal was detected, amplified by a narrow band-pass amplifier, put through a phase detector, and recorded on a strip chart.

The chart was then stripped off, and amplitude of the n-m-r signals were measured and corrected to the standard sample-weight basis.

Pointed Data

In summary form, these are some of their findings:

Particle size and distribution (within limits) and also packing of sample in test container have no effect on weight-corrected signal amplitude.

This is significant, for thus no special precautions are needed in these respects when preparing test samples. Finely powdered materials and whole grains can be easily handled.

The degree of correlation between n-m-r signal amplitudes and conventional moisture data has been determined for a variety of materials. These include modified and unmodified thick-boiling corn starches, acid-treated starch, thin-boiling starch, oxidized starch, starch derivatives, dextrines, corn gluten meal and feed, dextrose, corn syrup, and even corn. Moisture values ranged from 2 or 3% to approximately 50%.

With few exceptions, the relationships between n-m-r signal amplitude and moisture (vacuum-oven data) are exceedingly good, indicating broad application potentials.

The nature of this amplitude-moisture relationship varies somewhat from one product type to another. That is to say, the calibration curves cannot be superimposed.

One reason for these differences is that materials such as dextrose, corn starch, corn syrup, etc., contain different amounts of "bound" or "immobile" water, and the present instrument responds primarily to the hydrogen nuclei in "free" or "mobile" water.

Another reason: Some products contain higher concentrations of fatty material-containing "mobile" hydrogen nuclei. And these contribute also to the n-m-r signal amplitude.

Variation Benefits

Due to these and other factors, it is necessary to calibrate the instrument prior to the moisture-control application. However, this is not a problem and, in fact, the variation factors in the calibration curves can be turned to an advantage in some research problems.

For example, studies on "bound" and "free" water in hygroscopic substances are possible, since the technique is principally sensitive to hydrogen nuclei in "free" water.

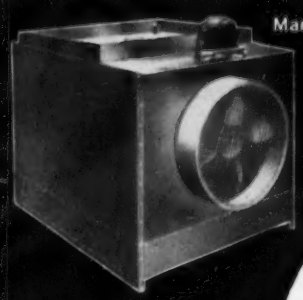
In a situation where moisture content is negligible or constant, and fat content is high and variable, it is quite possible that n-m-r absorption by "mobile" hydrogen nuclei in the fat will provide a means for rapid fat determination.

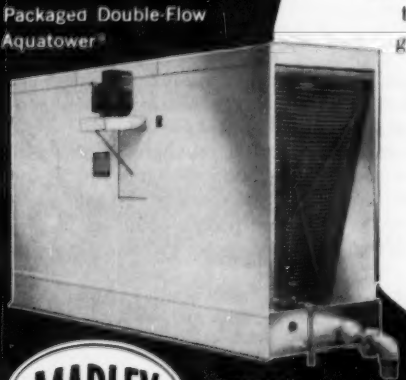
T. M. Shaw and his co-workers at the WRRL have shown that n-m-r signal width (hyrogen nuclei), as well as signal amplitude, is related to moisture over a limited range.

It is particularly notable that signal width is not affected by variations in sample quantity and packing. Consequently, when applicable it offers great advantages over signal amplitude measurements which, in quantitative studies, require correction to a standard or common weight basis.

Acknowledgments: Research was supported by Corn Industries Research Foundation, and was carried out at the Southwest Research Institute. Information was supplied by R. J. Smith and T. F. Conway, Research Department of Chemical Division, Corn Products Refining Co., Argo, Ill., and John P. O'Meara, Southwest Research Institute, San Antonio, Tex.

End (Resume reading on page 58)





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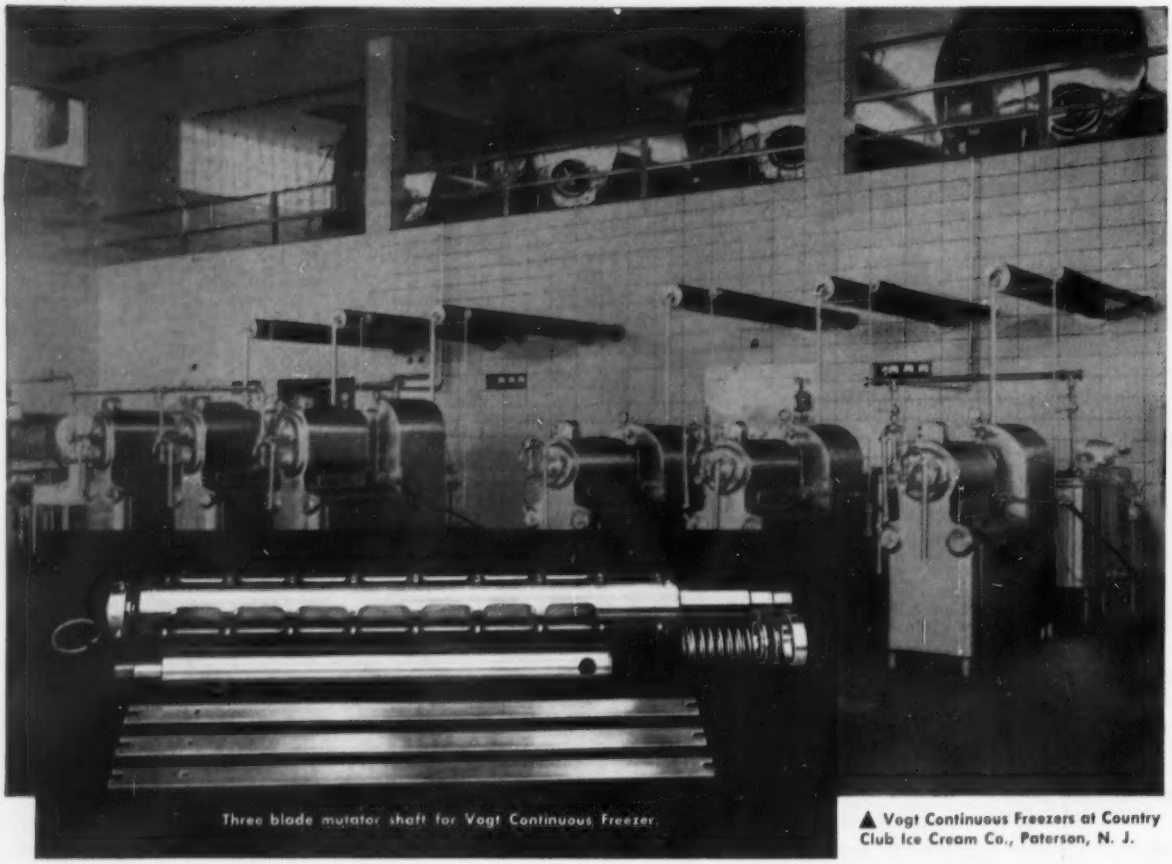

Three blade mutator shaft for Vogt Continuous Freezer.

▲ Vogt Continuous Freezers at Country Club Ice Cream Co., Paterson, N. J.

How stainless meets design requirements for intricate freezer parts

Resistance to the corrosive attack of strong cleaning solutions . . . and freedom from product contamination are but part of the reason why the scraper blades in these Vogt Freezers are made of stainless steel. Besides this requirement, the blades must be of the right hardness to take and hold a keen edge.

In their search for a material possessing both of these properties, the Cherry-Burrell Corporation, manufacturers of these continuous ice cream freezers, tried Crucible stainless steel, type 410. This straight-chromium grade has proved to be the most satisfactory material for this use. For 410 type stainless not only fights corrosion satisfactorily, but never harms the flavor or quality of the delicate dairy products it touches. And its high hardness and toughness mean that the scraper blades hold a sharp edge longer and require less frequent sharpening.

The rest of the freezer is made of stainless steel, too — because stainless is so easy to clean . . . and its attractive, bright finish makes a good impression on plant visitors.

Whether your product is ice cream, frozen fruit juice, meat, or *any* food — there's a grade of Crucible stainless steel that's just right for your equipment. Ask your Crucible representative for full details. And, if you'd like to have complimentary copies of the handbooks on the uses of stainless in your specific field, find the ones you want in the *Crucible Publication Catalog*. To get it, just write *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

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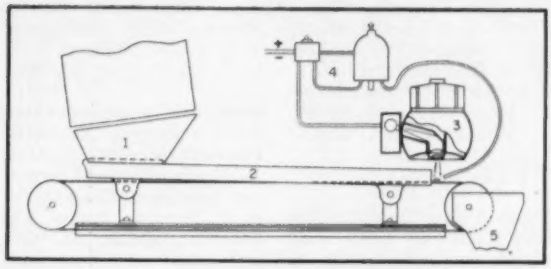
Recent Inventions



Photoelectric System Automatically Sorts Bean-Like Products by Color

Item discharges from hopper (1) onto conveyor (2) that positions it for inspection by scanning head (3). Light reflected from product actuates photocell-air valve assembly (4). Acceptable beans are blown into a collector (not shown), while those with off-colors remain on conveyor to discharge into chute (5).—*E. H. Bickley, Bala-Cynwyd, Pa. No. 2,730,234. Jan. 10, 1956.*

PRODUCTS

Malt Extract by Grinding Malt and Adjuncts, Mashing, Heating, Centrifuging—F. L. G. Kunz, Lake Forest, Ill. No. 2,726,957. Dec. 13, 1955.

Fruit-Pie Mixture Comprising Fruit, Sugar Syrup, Thickener —G. A. Fisher, Selinsgrove, to C. H. Musselman Co., Biglerville, Pa. No. 2,726,958. Dec. 13, 1955.

Malted-Milk Balls by Agitating Malted-Milk Crunch With Molten d-Glucose Monohydrate — C. H. Lushbough, Oconomowac, Wis., and P. G. Miller, W. Orange, N. J., to Carnation Co., Los Angeles. No. 2,726,959. Dec. 13, 1955.

Germicidal Detergent Composed of Quaternary Ammonium Germicide, Alkali-Metal Carbonate and Polyphosphate —L. L. Little and G. Chen, Morris Plains, N. J., to E. F. Drew & Co., New York City. No. 2,727,007. Dec. 13, 1955.

Water-Soluble Infant Cereal Containing Carbohydrate, Protein, Vitamins, Minerals—F. T. Kimball, S. Norwalk, Conn., and R. A. Benson, New York City. No. 2,727,822. Dec. 20, 1955.

Rindless Swiss Cheese Consisting of Drained Uncured Curd Pressed Into Six-Surface Block With Single Concavity — R. G. Tulane, G. H. Thomas, and M. Richardson, Dane County, to State of Wisconsin. No. 2,727,823. Dec. 20, 1955.

Rice-Bran Oil by Cooking Bran, Cooling by Evaporation, Solvent-Extracting, Filtering—E. A. Gastrock, H. L. E. Vix, E. L. D'Aquin, A. V. Graci, Jr., and J. J. Spadaro, New Orleans, to USA. No. 2,727,914. Dec. 20, 1955.

Dry Beverage Concentrate by Freezing Fermented Alcoholic Cereal Beverage at —50 C., Lyophilizing at 50-200 Microns Hg.—R. F. Mouton, Tervueren-Brussels, Belgium. No. 2,728,673. Dec. 27, 1955.

Milk Powder Having Protein That Forms Stable Water Suspension, Lactose as Alpha Crystals—P. E. Sharp, Piedmont, to Foremost Dairies, Oakland, Calif. No. 2,728,678. Dec. 27, 1955.

Meat Casing Comprising Amylose, Amylopectin—R. E. O'Brian, Des Moines, Iowa, and E. D. O'Brian, Whittier, Calif. No. 2,729,565. Jan. 3, 1956.

Lard, Oleo Oils by Hydrogenating Animal Fats, Separating Glycerides by Crystallization—W. C. Ault and S. G. Morris, Philadelphia, to USA No. 2,729,659. Jan. 3, 1956

EQUIPMENT

Dust Collector Having Top Inlet, Bottom Outlet, Baffle Screens and Plates. Dust Receptacle—C. J. Keiffer, Buffalo, N. Y. No. 2,723,725. Nov. 15.

Egg Cleaner Comprising Shaft-Mounted Buffing Roll, Cush-

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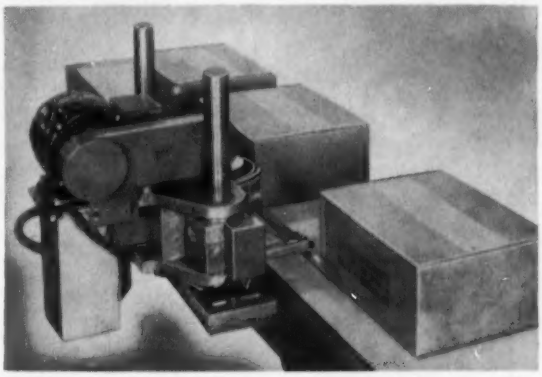

Model "750" ROLAPRINTER machine . . . imprints contents identifications, other legends on *side* surface of set-up cartons and cases, rectangular metal cans, wood crates, wire or strapbound bundles, etc. Attaches to conveyor, case-sealer, other production equipment. Also available for imprinting all 4 sides.

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Here's an attachment that combines the compactness and easy-installation features of ordinary marking devices with the printing-press precision of large in-line imprinting machines. The new Gottscho "ROLAPRINTER" machine is designed for easy do-it-yourself installation in idle space at any practical point on your line. Functions without operator attention by means of microswitch-activated electro-mechanism that controls placement of imprints in exact desired location on containers . . . regardless of whether container flow is regular or irregular. Has built-in motor-driven flexographic printing system with variable speed mechanism that synchronizes its action with surface speed of moving containers to assure clean, sharp, smudge-free impressions. Uses fast-drying liquid ink of any color and rubber type or dies. Quickly, easily adjustable to accommodate different size containers and to vary location of imprint.

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Chicago, Ill., Finn & Conway, 8216 S. Western Ave.
Cincinnati, O., G. T. Desjardins, 515 Melish Ave.
Cleveland, O., Glatte & Co., 2012 West 25th St.
Dallas, Tex., C. A. Drum, 6331 Northwood Rd.
Davenport, Ia., Deco Engineering Products, 320 Western Ave.
Denver, Colo., Slaybaugh-Thompson Co., 100 W. 13th Ave.
Des Moines, Ia., Deco Engineering Products, 1112 Locust St.
Detroit, Mich., O. Stirling, Inc., 6432 Cass Ave.
Fargo, N.D., Dakota Elec. Supply Co., 1017 4th Ave., N.
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Indianapolis, Ind., Young-Streeter Co., 6220 College Ave.
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Los Angeles, Calif., Pacific Scientific Co., 1430 Grande Vista Ave.
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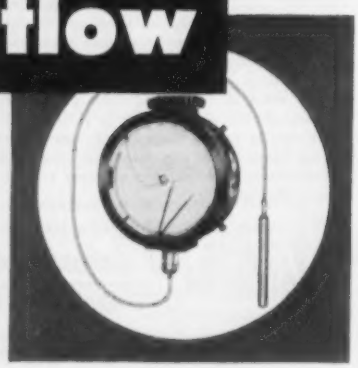

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Send for Condensed Catalog of rugged mercury-actuated Partlow Temperature Controls for gas, liquid or solid process control in −30°F to 1200°F range.

ioned Spiral Conveyor, Variable Egg Passageway—R. E. Ash, Hadley, Pa. No. 2,725,686. Dec. 6, 1955.

Chocolate-Tempering Unit Consisting of Closed Cylinder, Inner Rotor With Axially Spaced Threads Forming Annular Space, Temperature-Control Means—A. Hansen, Herlev, to Mikrovaerk A/S, Copenhagen, Denmark. No. 2,725,815. Dec. 6, 1955.

Dough Molder Employing Table, Conveyor Belt, Stop Means, Guide Rollers—M. A. Stickelber, Kansas City, Mo., to Stickelber & Sons. No. 2,725,828. Dec. 6, 1955.

Want more infromation on any of these recent patents — if so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.

Confection-Handling Machine Including Tank, Agitator, Bottom Opening, Inclined Dispensing Tube With Auger, Oscillating Knife, Heating Means, Conveyors—E. C. Hawthorn, Harrisburg, Pa. No. 2,725,829. Dec. 6, 1955.

Fat-Processing Unit Having Horizontally Mounted Cylindrical Container, Wall-Mounted Angular Wings—C. A. S. Thorstensson-Rydberg, Stockholm, to J. R. Andersson & Co., Aktiebolag, Sundbyberg, Sweden. No. 2,726,069. Dec. 6, 1955.

Homogenizer Comprising Housing, Frusto-Conical Rotor and Stator, Bearings—M. K. Tudor, Clifton, N. J. No. 2,726,070. Dec. 6, 1955.

Rotatable Bottle Brush Consisting of Elongated Cylindrical Body With Through Bore, Cleaning-Fluid Inlet, Internal Tube, Brush Ferrule—H. G. Volckening, Brooklyn, N. Y. No. 2,726,415. Dec. 13, 1955.

Continuous Potato-Chip Maker With Rectangular Oil Tank, Mechanical Slicer, Perforated Baskets, Reciprocating Conveyor, Basket-Lifting Device, Discharge Conveyor—R. Luke, Lynwood, Calif. No. 2,726,597. Dec. 13, 1955.

Barrel-Storage System Employing Horizontal Tiers, Barrel-Engaging Bed Portions With Endless Chains, Guard Rails, Arcuate Guide Means—W. C. Bee, Bloomfield Hills, Mich., to Palmer-Bee Co., Detroit. No. 2,726,753. Dec. 13, 1955.

Milk-Can Dumper Including Shaft-Mounted Inverter Platform, Tilting Lever, Transfer Member—H. M. Kendall to N. A. Kendall, Potsdam, N. Y. No. 2,726,779. Dec. 13, 1955.

Solids Feeder Having Open-Bottom Hopper, Horizontal Plate-Like Member, Agitating and Feeding Element Comprising Oscillating Cross Bars—H. R. Seymour, Bartow, Fla. No. 2,726,792. Dec. 13, 1955.

Poultry Scald Tank Comprising Conveyor, Bird-Suspending Device, Spray—H. J. Long to Swift & Co., Chicago. No. 2,727,273. Dec. 20, 1955.

Continuous Coffee Roaster Consisting of Superposed Horizontal Pipes Alternately Rotated in Opposite Directions, Helicoidal Threads Forming Axial Channels, Feed Hopper, Hot-Air Blower—F. Naselli, Sao Paulo, Brazil. No. 2,727,316. Dec. 20, 1955.

Egg Grader With Endless Multiple-File Conveyor, Aligning Means, Single-File Conveyor, Egg Weighing and Discharge Device—R. C. Sneed, Piedmont, Calif. No. 2,727,625. Dec. 20, 1955.

Net Weigher Employing Feeder Synchronized With Conveyor—W. J. Sackett, Baltimore. No. 2,727,669. Dec. 20, 1955.

Ice Cream Extruder Including Tank, Hemispherical Cup, Carriage Means, Controls—R. G. Tarr, Villa Park, Ill. No. 2,728,306. Dec. 27, 1955.

Cross-Grain Dough Molder Having Conveyor, Rolls, Flexible End Molders, Vibration Means—H. C. Rhodes, Portland, Ore., to Read Standard Corp., New York City. No. 2,728,307. Dec. 27, 1955.

Dough Pump Comprising Casing, Coaxial Rotors With Non-Aligned Peripheral Pockets, Translatably Mounted Plate Members—R. E. Nelson, Rosamond, Calif., to Read Standard Corp., New York City. No. 2,728,308. Dec. 27, 1955.

Shrimp Grader Consisting of Rearwardly Diverging Bars That Form Widening Longitudinal Channels, Vibrating and Gyrating Means—E. E. Greiner, New Orleans. No. 2,728,455. Dec. 27, 1955.

Dough-Pan Loading Control Including Stop Plate, Spring

and Guide Means, Trip Lever—H. C. Rhodes, Portland, Ore., to Read Standard Corp., New York City. No. 2,728,506. Dec. 27, 1955.

Pan-Indexing Device Having Unit Mounted Along Conveyor That Displaces Pan's Trailing Edge, Permitting Finger-Like Member to Engage Leading Edge of Next Pan—F. V. Marasso, Joliet, Ill., to Union Machinery Co. No. 2,728,508. Dec. 27, 1955.

Sugar-Juice Clarifier Employing Cone-Bottom Tank, Mud-Chamber, Partition Separating Skimming and Flocculating Zone From Upper Reaction and Clarification Area, Upper Juice Inlet and Outlet Means, Bottom Mud Discharge—J. E. Swanson, Chicago, to Graver Tank & Mfg. Co., East Chicago, Ind. No. 2,728,694. Dec. 27, 1955.

Poultry Scalder Comprising Tank With Partially Cylindrical Bottom, Propeller, Deflector—R. W. McKinley, J. C. Howard, and J. H. Ernstes, to Ashley Machine Co., Greensberg, Ind. No. 2,728,938. Jan. 3, 1956.

PROCESSES

Orienting Cherries Preserved in Brine by Washing With Detergent, Rinsing, Rotating Fruit—R. B. Vaile, Jr., Palo Alto, H. J. Jespersen, Menlo Park, and J. W. Edgemond, Jr., Los Altos, Calif., to S. & W. Fine Foods, San Francisco. No. 2,724,487. Nov. 22, 1955.

Concentrating Monoglycerides by Extracting Fatty Material With Methyl Alcohol Solutions of Increasing Water Content—N. H. Kuhrt and E. A. Welch to Eastman Kodak Co., Rochester, N. Y. No. 2,727,913. Dec. 20, 1955.

Converting Lard Into High-Ratio Shortening by Aerating Molten Lard, Pre-Cooling, Chilling, Agitating, Adding Warm, Colloidized Animal Phosphatide Dispersion, Extruding, Emulsifying—D. H. Griffin, St. Louis, R. N. Fiss, Belleville, Ill., L. Kiers, Webster Groves, Mo., to Hunter Packing Co., E. St. Louis, Ill. Nos. 2,728,674-675. Dec. 27, 1955.

Preserving Apple Slices by Vacuumizing. Blanching in Sugar Syrup Having Carboxylalkyl Cellulose Derivatives, Holding in Above Solution—L. H. Burt to Hercules Powder Co., Wilmington, Del. No. 2,728,676. Dec. 27, 1955.

Making Butter Without Churning by Mixing Butter With High-Fat Cream at 17-33 C.—B. de Goede to De Nederlandse Centrale Organisatie Voor Joegepast-Natuurwetenschappelijk Onderzolk, The Hague, Netherlands. No. 2,729,563. Jan. 3, 1956.

Recovering Flavor Volatiles From Gaseous Materials by Contacting With Refrigerated Hygroscopic Aqueous Solution of Inorganic Electrolyte Immiscible With Flavoring Oil, Holding, Separating—G. J. Keller, Arcadia, Calif., to USA. No. 2,729,564. Jan. 3, 1956.

Dehydrating Potatoes by Cutting, Cooking, Rapidly Freezing, Thawing—W. O. Harrington, R. N. McCready, and R. L. Olson, Berkeley, Calif., to USA. No. 2,729,566. Jan. 3, 1956.

PACKAGING

Cup Capper Consisting of Table, Lid Magazine, Guide Post, Suction-Actuated Head—C. E. Eisenhart to Eisenhart Dairy, York, Pa. No. 2,723,791. Nov. 15, 1955.

Labeler for Non-Circular Containers—A. F. Luthi, Los Angeles, to Luthi Machinery & Engineering Co., Gardena, Calif. No. 2,727,647. Dec. 20, 1955.

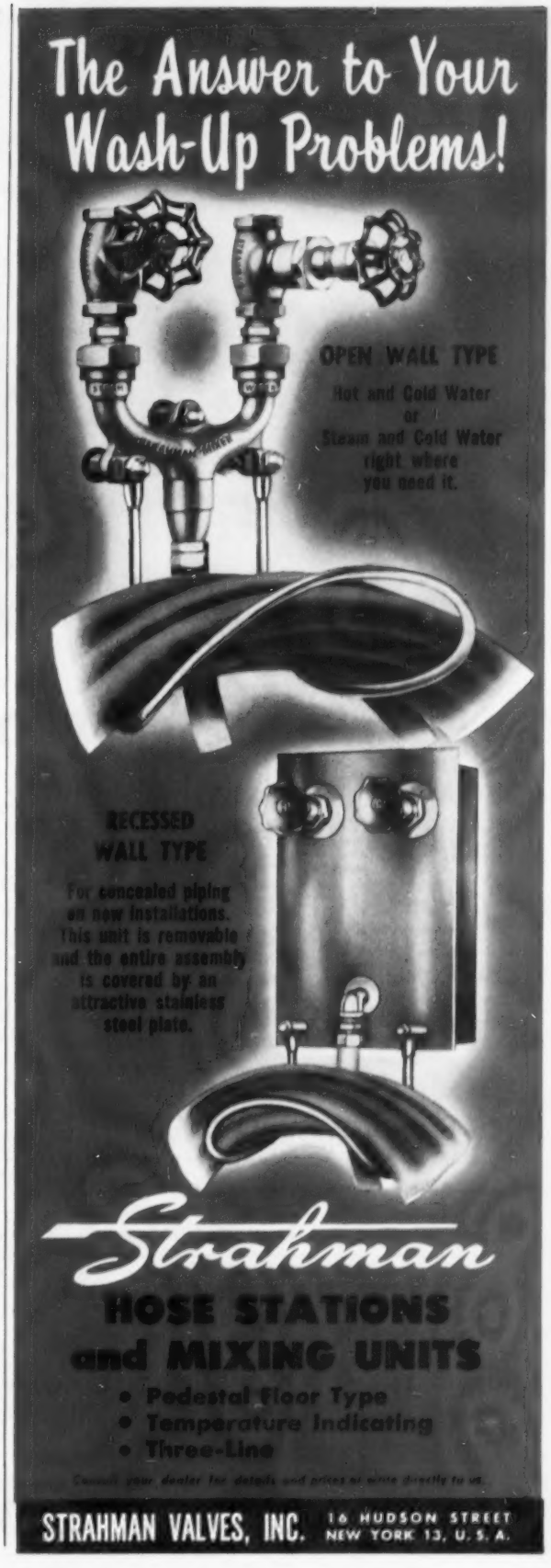
Refrigerated Shipping Box Consisting of Insulated Rectangular Body, Integral Moisture-Proof Lining, Ice Compartment—F. Lobl, Middleboro, Mass. No. 2,728,200. Dec. 27, 1955.

Bottle Carrier Comprising Paperboard Carton, Handle Skeleton, Load-Supporting Portions—S. B. Howard to Atlanta Paper Co., Atlanta, Ga. No. 2,728,485. Dec. 27, 1955.

Frozen-Confection Package Employing Polyethylene Pouch, Handle, Heat-Sealable Sheath—B. W. Colman, Berkeley, Mich. No. 2,728,677. Dec. 27, 1955.

Package Filler Having Endless Conveyor, Measuring Pockets, Rake Members—C. J. Malhoit, Oak Park, Ill., to F. B. Redington Co., Chicago. No. 2,729,380. Jan. 3, 1956.

Beverage Can Having Auxiliary Drinking Device—P. E. Gilbert, Chicago. No. 2,729,956. Jan. 10, 1956.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Men & Companies

Industry

William Brady is now president and chief executive officer of The Corn Products Refining Co., New York City. He joined the company in 1919 and has been v.-p., assist. to the president and a member of the board since 1947.

Anderson, Clayton & Co. has announced that the name of its **Mrs. Tucker's Products Div.** has been changed to **Anderson, Clayton & Co. Foods Div.**

Armour & Co. has shut down its slaughtering facility at South San Francisco.

Campbell Soup Co., Camden, N. J. will construct a new office building at Civic Center in Camden, slated for completion in about a year.

C & H Sugar Refining Corp. is celebrating its 50th year of continuous operation.

Clinton Foods, Inc., Clinton, Iowa, has begun construction of a two-story research lab.

Cornwall Canning Co. is planning a new vegetable quick-freezing plant at Taber, Alberta to be in operation by '57.

Curtiss Candy Co.'s main office building, Chicago, has been destroyed by fire.

Falstaff Brewing Corp. has agreed to purchase **Galveston-Houston Breweries, Inc.,** Galveston, Texas.

Foremost Dairies, Inc., Jacksonville, Fla. has announced it is acquiring: **Fla. Juice, Inc.,** Miami, **H. A. McDonald Creamery Co.,** Detroit, and **Jones & Griest Ice Cream Co.,** Washington, Pa.

Gallo Sales Co., distributor of Gallo wines, has purchased a $300,000 warehouse and office building in South San Francisco.

General Foods Corp., White Plains, N. Y., has opened its new West Coast distribution center at San Leandro, Calif.

H. J. Heinz Co. of Canada, Ltd., has announced a $5 million expansion and modernization program for the Canadian company.

Hunt Foods, Inc., Fullerton, Calif., will begin construction of a new 225,000 sq. ft. warehouse in Fullerton.

Langendorf United Bakeries Inc. expects its new $2½ million baking plant to be in production about the middle of the month.

Libby, McNeill & Libby has purchased a vegetable packing plant at Wallaceburg, Ont., from **H. J. Heinz of Canada, Ltd.**

John Morrell & Co. will install a hog slaughtering plant at its Estherville, Iowa, packing house.

Perry Bros., Inc., Woodside, N. Y., has established a new subsidiary, **Perbro Laboratories,** to manufacture essential oils and flavor bases.

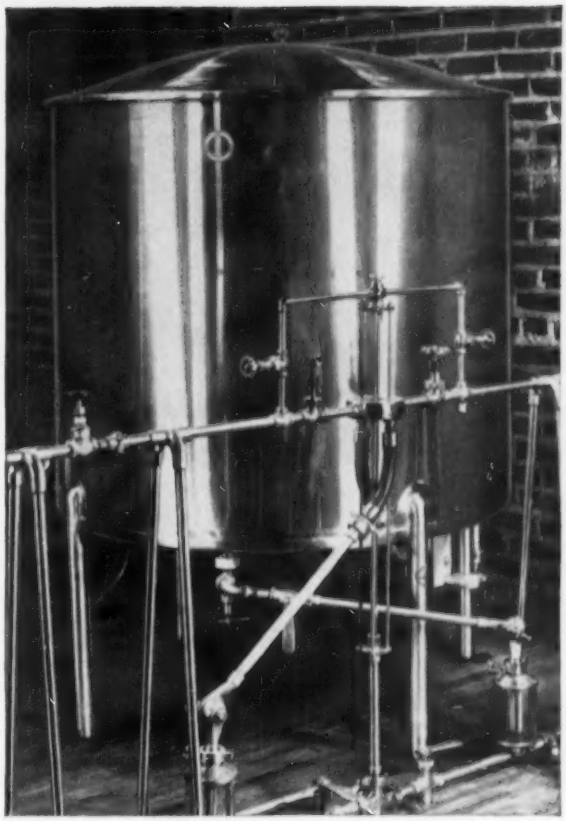
Poultry Producers of Central Calif. will build an egg grading plant in San Leandro equipped to handle 175,000 doz. eggs per day.

Sunkist Growers Products Dept., Ontario, Calif., has announced **Ungerer & Co., Inc.,** New York City, will represent the firm along with **Fritzche Bros., Inc.,** and **Dodge & Olcott, Inc.,** in sales of Exchange Brand lemon & orange oils.

S & W Fine Foods, Inc., San Francisco, is now operating its new 250,000 sq. ft. warehouse.

Van Camp Sea Food Co. has purchased all common stock of **National Packing Co.,** Puerto Rico.

Van Wagenen & Schickhaus, Newark, N. J., has broken ground for a new meat packing plant at Kearny, N. J.



Store what you like...mix as you like in Cherry-Burrell open top tanks

Here's a small single-shell tank of many uses. Just lift off its snug-fitting cover . . . dump in your liquids or ingredients . . . and you have the ideal stainless steel tank for storage or surge, for side or bottom mixing.

Cherry-Burrell "reverse dish" bottom design not only retards "settling out," but also makes a stronger, lower tank. Helps assure better mixing, too, by setting up turbulent agitation currents.

When you're ready, these tanks drain rapidly and cleanly. Bottom design permits convenient outlet location—fast drainage through flush-type stainless steel angle valve.

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your Cherry-Burrell Representative — about our three models of open top stainless steel tanks. Six sizes to choose — from 60 to 500 gallons.
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Adrien J. Falk, (above) president of S & W Fine Foods, Inc., San Francisco, will retire May 1. **Joseph Blumlein,** executive vice-president since 1946, has been elected to succeed him in the post.

Velvel Nut Products Co.'s Krun-Chee Potato Chip Div. will have a 8½ million addition to its Detroit plant.

Weston Biscuit Co., Inc., will lease a 10,000 sq. ft. plant now being constructed in Buffalo, N. Y.

Personnel

Stephen Budd, Jr. has been named assistant to the president of Minute Maid Corp., New York City.

Nile Cave has been appointed general manager of National Biscuit Co.'s Special Products Div., New York City.

Dr. S. L. Chen has been named senior scientist by Red Star Yeast & Products Co., Milwaukee.

D. M. Chenoweth, general manager of Molson's Brewery, Ltd., has been elected to the firm's board of directors.

Benjamin Detwiler, former vice-president, has been named president of Borden's Farm Products of New Jersey, Inc.

John Dupree has been elected vice-president in charge of public relations and **Hal Chase** v.-p. and director of marketing for Dole Hawaiian Pineapple Co., Honolulu.

Frank English has been elected president of Planters Nut & Chocolate Co., Wilkes-Barre, Penna.

Franklin Fero has been named v.-p. and treasurer of Beech-Nut Packing Co., Canajoharie, N. Y., and **A. Burr Craft** named plant manager of the firm's Rochester plant.

Abraham Fuchs has retired from Public Health Service Commissioned Corps after 39 years of service.

Paul Gray, Jr. has been re-elected chairman of Institute of American Poultry Industries.

Mrs. William Haebler and **Henry Walter, Jr.** have been elected to the board of van Ameringen-Haebler, Inc., New York City.

L. H. Hogue has been appointed vice-president and director of Paulus Bros. Packing Co., Salem, Ore.

Mark Hollis, U. S. Public Health Service, has received an honorary Doctor of Science degree from Univ. of Florida.

Keith Johnston is now a member of the board of Robert A. Johnston Co., Milwaukee.

William McChesney has been made controller of Burry Biscuit Corp., New York City.

J. W. McDonald has been named treasurer of National Brewing Co., Baltimore, Md.

Dr. Howard Mishkin has been appointed general manager of Excelsior Quick Frosted Meat Products, Inc., Long Island City, N. Y.

Charles Mortimer, president of General Foods, has received an honorary Doctor of Laws degree from Long Island University.

Howard Rath has been elected chairman and chief executive officer of Rath Packing Co., Waterloo, Iowa, and **A. D. Donnell** chosen president.

John Red has been named v.-p. of Canada Dry Ginger Ale, Inc., New York City.

Mrs. Janet Crawford Taylor has returned to National Cranberry Assn. as home economics director.

Norbert Volle has been named manager of product development for processed foods div. of Kroger Co., Cincinnati.

H. Von Bergen has been elected president of American Crystal Sugar Co., Denver, Colo.

Oliver Willits has been named chairman of Campbell Soup Co., Camden, N. J. succeeding **James McGowan, Jr.** who has retired.

James Windham has been named president of Blatz Brewing Co., Milwaukee.

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Vanilla Bean Flavor by Firmenich stems from the vanilla bean. By original research, its components and desirable characteristics have been isolated, identified, and synthesized. By patient and painstaking laboratory techniques, they have been reconstructed for you in a precise and potent flavor material with all the aromatic qualities of the original. Vanilla Bean Flavor by Firmenich comes to you as an economical replacement of pure vanilla extract, of pure vanillin, or to use in combination in the manufacture of all products that you flavor with this most popular of flavors. Contains no coumarin.

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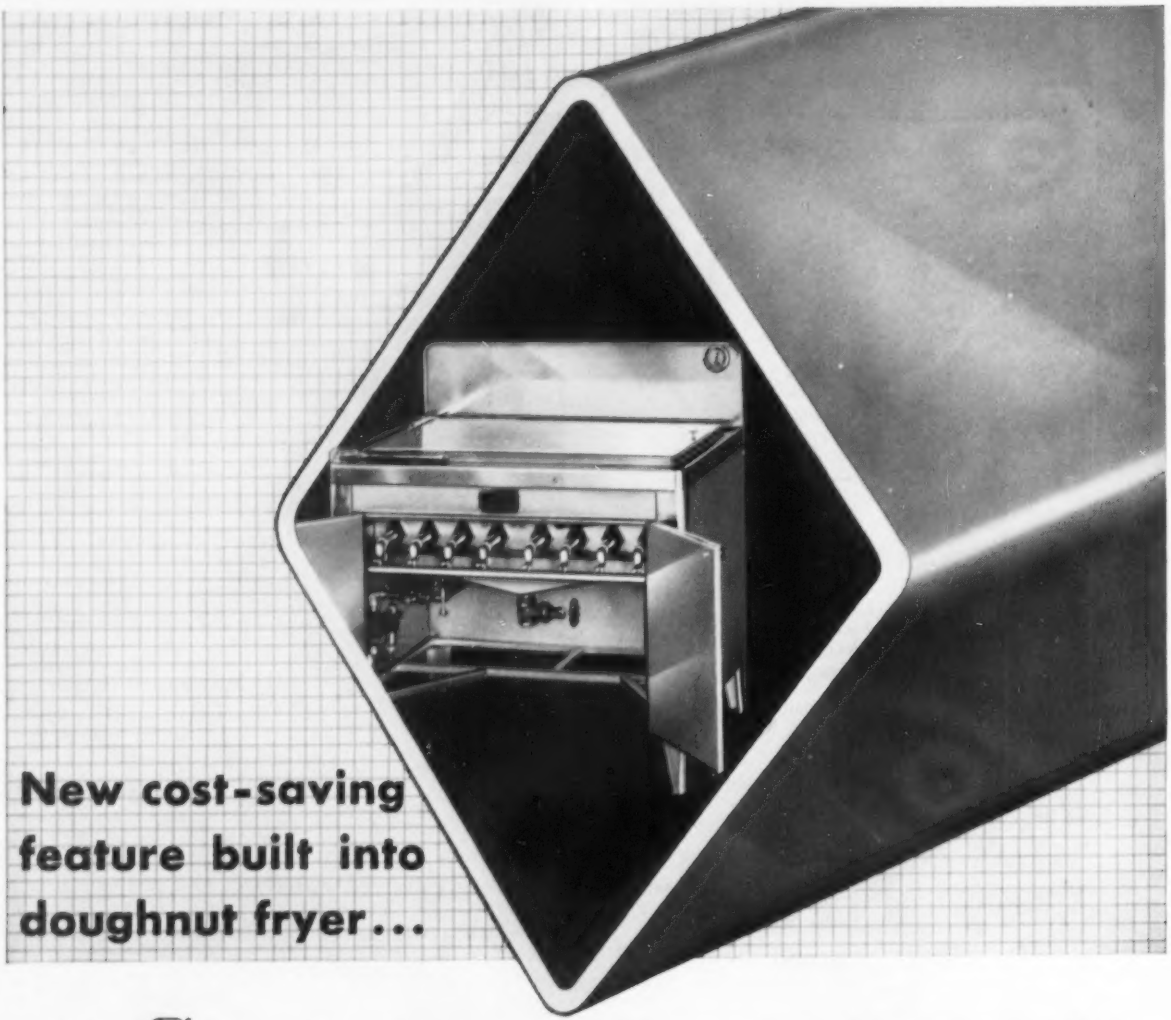

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This is just one more example of combining the inherent advantages of stainless—high strength-weight ratio, fine appearance, corrosion and abrasion resistance and super sanitation—with the extra benefits of special shapes of Carpenter Stainless Tubing. Why not investigate the possibilities of designing and building the advantages of Carpenter Stainless Tubing shapes into your products. Call your nearest Carpenter Distributor or Branch Office for consultation and information.

MEMBER

The Carpenter Steel Company, Alloy Tube Division, Union, N. J.

Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Carpenter

Stainless Tubing & Pipe

Adolph Zoratti has been appointed master brewer of Saskatoon Brewing Co., Saskatoon, Saskatchewan.

Associated Industries

Acme Steel Co., Chicago, has broken ground for a new $1½ million office building in Riverdale, Ill.

Alcoa Foundation has granted $3,000 to Michigan State Univ. to help equip a new packaging lab.

American Machine & Foundry Co., New York City, has appointed Alfred Fava general manager of its Bakery Div.

Connelly Containers, Inc., Philadelphia, has appointed Roscoe Bowers v.-p.

Continental Can Co.'s Metal Div. has named Reubin Perin executive v.-p.

Dairy Industries Supply Assn. has elected Sidney Crofts of **Batavia Body Co.**, Batavia, Ill, president.

Detecto Scales, Inc., Brooklyn, has elected Samuel Jacobs president.

Dixie Cup Co. has elected Edgar Winnie and C. Moore v.-p.s.

Dow Chemical Co. has announced plans for a $20 million manufacturing operation located near Baton Rouge, La.

Extruders, Inc., Hawthorne, Calif., has completed new equipment to more than double its capacity to extrude polyethylene film.

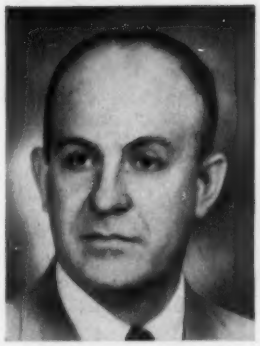
General American Transportation Corp.'s Plastics Div. will construct a research and developmental lab in East Chicago, Ind.

Kaiser Aluminum & Chemical Corp., Oakland, Calif., will build a new aluminum food container plant at Wanatah, Ind.

Olin Mathieson Chemical Corp. plans to enter the aluminum field with a $120 million plant in the Ohio River Valley.

Paterson Pacific Parchment Co. has opened its new $750,000 parchment converting plant in San Jose, Calif.

QM Food & Container Labs for the Armed Forces, Chicago, has promoted Dr. Harry Goresline to assoc. scientific director.



Minos Asproyerakas has been appointed plant engineer for The Kitchens of Sara Lee, Inc., Chicago, Ill. He is former chief engineer for DeMets, Inc., also of Chicago.

Rheem Mfg. Co., Chicago and **Richmond Radiator Co.**, Richmond, Va. have voted to merge.

Takamine Lab, Inc., Clifton, N. J., has been merged into **Miles Labs., Inc.**, Elkhart, Ind., as of March 7.

Thatcher Glass Mfg. Co., Inc., Elmira, N. Y., has appointed Reginald Burd v.-p. and general manager of the firm's Pacific Coast Div., and named Charles Winding a director.

Vogel-Ritt, Inc. has appointed Sam Goldstein New York manager of its division, **Industrial Sanitation Consultants.**

Westfield River Paper Co., Inc. has sold its Manayunk plant to a new firm, **Pencoyd Paper Co.**

White Cap Co., Chicago, has elected Robert P. White to vice-president.

Deaths

Joseph A. Baker, 58, board chairman of Baker Perkins, Inc. and president of Canadian Baker Perkins Ltd.—Feb. 21.

Ernest Hemrich, 66, president and founder of Wash. Chocolate Co., Seattle.—March 1.

Ruben Rath, 63, board chairman of Rath Packing Co.—Feb. 14.

Dr. John Sale, retired chemist of USDA, Food & Drug Div.—Feb. 20.

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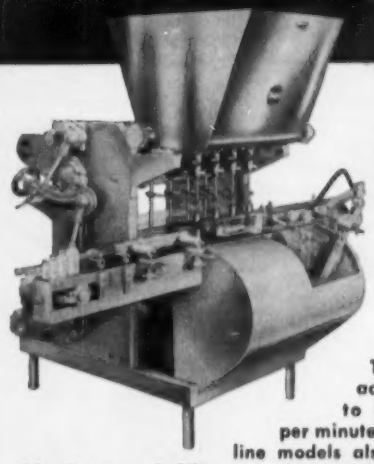

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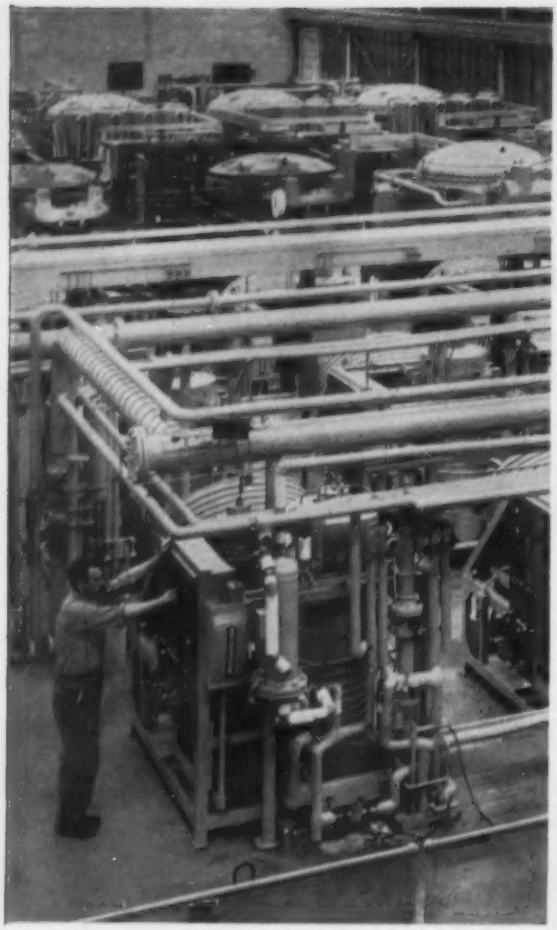

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New Catalogs and Bulletins

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PLANT ENGINEERING

Packaged Cooling Unit

Bulletin explains features of a self-contained refrigerating unit, comprising compressor, fan, coil, and condenser. Available in ¼ to 1 hp models. 2p.—*Nor-Lake, Inc., Hudson, Wis. (222A)*

Fume Collectors

Concerns advantages of floor-type and cone-bottomed wet-dust fume collectors. Units feature six separate scrubbing stages. Bulletin 1155-A, 6p.—*Zack Co., Chicago. (222B)*

Dust Control

Concerns action of a simple air cleaner that employs cloth filter tubes to control dust-laden air. Manual has many photos, drawings, and diagrams to illustrate operation. Sizes are tabled. Catalog 72-B, 38p.—*American Wheelabrator & Equipment Corp., Mishawaka, Ind. (222C)*

Grate-Type Magnets

Shows installation of a grate-type permanent magnet in hoppers, floor openings, vertical closed chutes, and ducts. Unit separates magnetic particles from powdered or granular food material. Bulletin B-214, 4p.—*Eriez Mfg. Co., Erie, Pa. (222D)*

Walk-in Coolers

Illustrates compact construction of a series of wooden or metal-clad walk-in coolers and freezers. Packaged units are shipped in knocked-down sections. 2p.—*Nor-Lake, Inc., Hudson, Wis. (222E)*

Space Coolers

Depicts line of floor-type, dry-coil space coolers for chilling air in process areas. Available in 8 different sizes ranging from 2,210 to 14,760 Btu. per degree of temperature difference. Air capacities from 3,610 to 19,660 cfm. 4p.—*Industrial Mfg. & Engineering Co., Chicago. (222F)*

Electric Thermostats

Describes room-type electric thermostats and a series of immersion thermostats for hot water heating systems and similar equipment. Selection data is tabled. Bulletin 1000-B, 3p.—*Sarco Co., Inc., New York City. (222G)*

Stainless Steel Facts

Interesting catalog gives comprehensive data on chemical composition, mechanical properties, and impact, abrasion, corrosion, and heat resistance of various alloy and stainless steels. Catalog 175-A, 102p.—*Electric Steel Foundry Co., Portland, Ore. (222H)*

Waste Treatment

Offers solutions to some industrial water and waste treating problems. Numerous diagrams illustrate suggested systems. Technical paper 64, 6p.—*Milton Roy Co., Philadelphia (222I)*

Condensate Pumps

Shows single and duplex centrifugal condensate pumps. Vertical design places close-coupled motors above floor—away from water and dirt. Full particulars given in diagram and charts. Bulletin 1460, 4p.—*Sarco Co., Inc., New York City. (222J)*

Time Delay Relays

Manual shows complete line of solenoid-actuated, pneumatically-timed time delay relays. Numerous photos illustrate compact units, engineering drawings show dimensions.—*Elastic Stop Nut Corp. of America, AGA Div., Elizabeth, N. J. (222K)*

Air Handling System

Comprehensive booklet gives full selection and application data on a series of ceiling-suspended and floor-mounted air handling systems. Manual EM-G5622, 40p.—*Dayer-Hanson, Inc., Los Angeles. (222L)*

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Oil Separator

Considers features of a heavy-duty oil separator particularly suitable for edible oils and fats. New-type open hood is designed for simple cleaning. Diagram illustrates construction. Bulletin 2142, 2p.—*Centrico Inc., Englewood, N. J. (222M)*

Foamless Pumps

Bulletin discusses line of involute centrifugal pumps made in industrial and sanitary models. They are available in five different pipe line connections, and have an adjustable discharge that can be positioned to fit any setup. Capacities to 120,000 lb. per hr. Product

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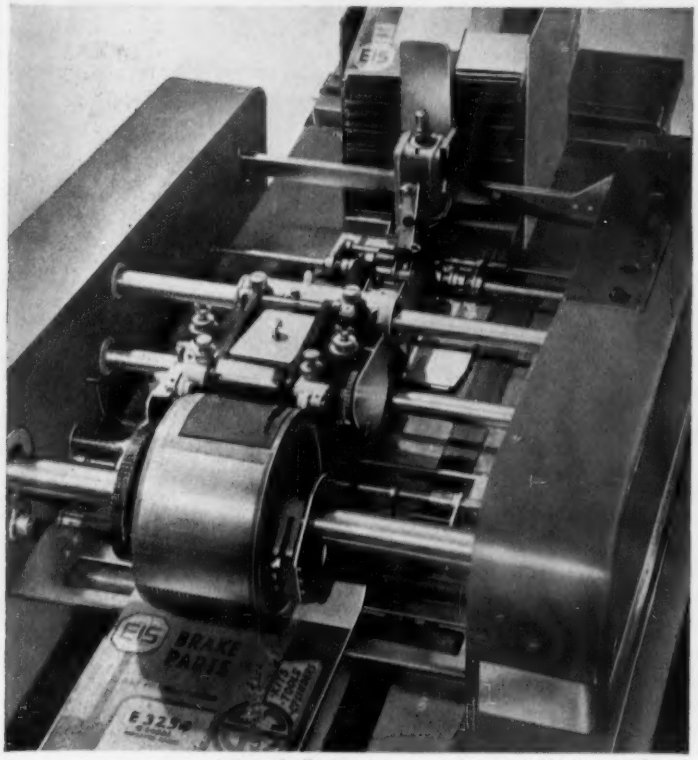

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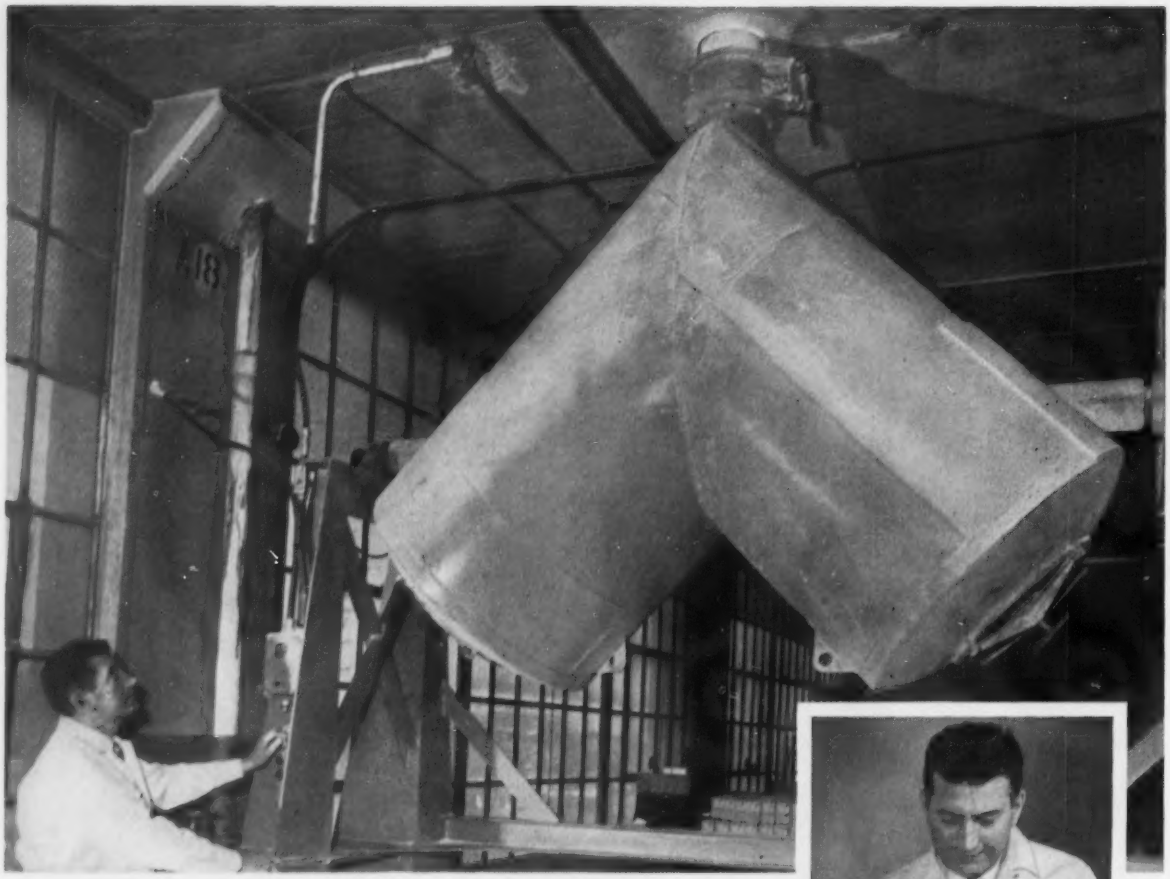

This giant p-k twin shell blender has already blended millions of pounds of Durkee seasoning salts, loading efficiently from the floor above and discharging to the floor below. Blending, cleaning and maintenance time have been so reduced that this twin shell paid for itself in only a few months. Stewart Woodruff (right), head of Durkee's research lab, conducted the extensive tests which led to the selection of the twin-shell blender.

"Blends perfectly; virtually self-cleaning":

DURKEE SELECTS p-k BLENDER AFTER LABORATORY "PRE-TEST"

We're at Durkee Famous Foods, in Elmhurst, N. Y. . . . and you're looking at a 1000-lb. p-k twin shell blender which was so thoroughly pre-tested, success was assured even before it was installed!

Extra-effective blending is a must at Durkee, because physical segregation between various ingredients in Durkee's onion salt and garlic salt is a problem. That's why, when it comes to choosing a blender, there could be no guesswork.

The twin shell, along with other blenders, was put under careful scrutiny. A 4-quart p-k laboratory model underwent a series of tests in Durkee research labs. There, in much less than half the time needed to produce a hand sample of almost perfect theoretical value, the p-k twin shell, in test after test, produced identical samples. Because blending results obtained with twin shell lab models scale up accurately to production sizes, Durkee research men knew the twin shell was the "just right" blender for the job—*before* it was purchased!

To find out how you, too, can "pre-test" a p-k twin shell blender in your plant, lab or mill, write us today. Ask, too, for your copy of p-k Catalog 13. It is free for the asking, of course. **The Patterson-Kelley Co., Inc., 1540 Lackawanna Avenue, East Stroudsburg, Penna.**

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contact surfaces are of stainless steel. Bulletin G-513, 4p.—*Cherry-Burrell Corp., 427 W. Randolph St., Chicago. (222N)*

Food Plant Floors

Concerns tile and mastics for installation of the corrosion resistant food plant floor. Different compounds available for tile setting or brick laying methods. Base compound bonds tile to concrete floor. Table estimates quantities needed per 100 sq. ft. Bulletin 3-2, 8p.—*Atlas Mineral Products Co., Mertztown, Pa. (225A)*

Compact Gear Motors

Comprises selection data, construction features, dimension tables, load ratings, and mounting arrangements, for a wide range of gearhead motors. Units meet new NEMA size ratings. Book 2447, 28p. — *Link-Belt Co., Chicago. (225B)*

Plastic Pipe, Fittings

Bulletin presents data on a varicty of pipes, valves, flanges, and fittings, made of a rigid plastic material. Charts give selection data, maximum operating pressures, and weights. Bulletin 80-3, 8p.—*Joseph P. Ryerson & Son, Inc., Chicago. (225C)*

Barometric Condensers

Catalog details installation and action of a series of barometric condensers, for removing air, exhaust steam, and other vapors from vacuum equipment. Tables give sizes, capacities, dimensions, weights and pertinent selection data for multi-jet spray type, multi-spray, and counter current condenser models. Bulletin 5AA, 12p. —*Schutte & Koerting Co., Cornwells Heights, Pa. (225D)*

Vapor Barriers

Shows application, installation, and effectiveness of sheet aluminum insulation for protecting freezing and cooling rooms. Detailed drawings illustrate application, graphs depict efficiency. 12p. —*Alumi-seal Corp., New York City. (225E)*

Efficient Blower

Informs on a compact blower with motor mounted inside blower blades. Adjustable foot enables 4-way mounting. Direct drive between motor and blower wheel. 6p. — *National-U. S. Radiator Corp., Viking Div., Cleveland. (225F)*

Solenoid Valves

Refers to construction features and specifications of a wide line of solenoid valves for automatic control of fluid flow. Manual pictures each model and gives general servicing hints. 28p.—*Jackes-Evans Mfg. Co., St. Louis. (225G)*

Refrigeration Compressors

Comprehensive catalog discusses refrigeration principles and presents features, installations, and operational data for a series of freezing compressors. Contains handy technical tables. Bulletin 80-D, 34p.—*Frick Co., Waynesboro, Pa. (225H)*

Fast Manlift

Construction and operation of a flexible manlift elevator, which can also be used to convey bags and other packaged material, is discussed. Pictures and diagrams illustrate components. Bulletin 07B6878B, 6p. — *Allis-Chalmers Mfg. Co., Milwaukee, Wis. (225I)*

High Pressure Pumps

Gives applications of a series of high-pressure, horizontal, triplex pumps. They are available in capacities ranging from 60 to 6,000 gph. Bulletin P-55, 6p.—*Manton-Gaulin Mfg. Co., Inc., Everett, Mass. (225J)*

Rotary Feeders

Shows construction features of a rotary feeding device for powdered or granular products. Full selection data is given. Bulletin P-55, 12p.—*Prater Pulverizer Co., Chicago, (225K)*

Motor Line

Illustrates a series of drip-proof, enclosed, and explosion-proof motors. These electric drives are available from ½ to 40 hp, 900 to 3,600 rpm. Detailed specifications are tabled. Bulletin 1700, 12p.—*Louis Allis Co., Milwaukee. (225L)*

Colored Templets, Tapes

Presents a new method for color-coding master layouts, production control charts, and graphs. System uses a series of colored templets and transparent, continuous tapes, printed on white acetate film. Prices are listed and available designs pictured. 56p.—*Repro-Templets, Inc., Oakmont, Pa. (225M)*

Liquid-Heating Nozzles

Presents an injection nozzle for direct steam heating of liquids. Units are designed to reduce tank vibration, up process efficiency. Bulletin Supplement 3A, 2p.— *Schutte & Koerting Co., Cornwells Heights, Pa. (225N)*

Boiler Feed Pumps

Informs on a series of 2-stage, centrifugal-type boiler feed pumps available in capacities to 2,500 gpm. Detailed cross-section drawings illustrate construction. Bulletin W-318-B23P, 4p.—*Worthington Corp., Harrison, N. J. (225O)*

Electric Clutches

Technical report analyzes engineering features and operating advantages of electric fan clutches, mounted on internal combustion engines. 22p.—*Warner Electric Brake & Clutch Co., Beloit, Wis. (225P)*

Automatic Defroster

Gives operating facts on an automatic electric defroster with free-flowing drain for low tem-

Is Space an Important Factor?

Then Use This Distinguished Line of Close-Coupled Pumps

These GMC Pumps are ideal for a multitude of jobs. Smooth and efficient whether vertical, horizontal, up-side-down or any inclination. Low first cost, low power and maintenance costs. Top quality "by Aurora."
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Open-through-close door cycle is completed in 8-10 seconds automatically. Users report expensive man-truck-hours fully utilized at top efficiency — more goods handled in less time. "Open-door-time" is reduced 75%, resulting in substantial refrigeration savings.

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Jr. Catalog 56 G—General Purpose, Warehouse Trucks, Casters and Wheels

Bulletin 48 JS—Jacks and Skids for Mobile Storage

Bulletin 54 DJ—Dairy Industry Trucks

Booklet 53 SR—General Purpose Trucks and Barrel Handling Equipment

Bulletin 53 SC—Trucks for In-Plant Feeding

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perature applications. Diagram shows installation and control system. Catalog CC512, 4p.—*Drayer-Hanson Inc., Los Angeles.* (225Q)

Plastic Fittings

Presents selection data for a series of connectors, elbows and tees, constructed of acid- and alkali-proof nylon plastic. 4p.—*Jaco Mfg. Co., Cleveland.* (226A)

Versatile Insulation

Gives all facts on an insulating material made from redwood bark that is said to be fire retardant, odorless, moisture resistant, and repellent to rodents and insects. Numerous diagrams show installation. Bulletin C-504, 8p.—*Pacific Lumber Co., San Francisco.* (226B)

Pressure Reducing Valves

Concerns two models of a direct-operating pressure reducing valve recommended for dead-end water service where flow is intermittent and subject to abrupt fluctuation. Dimensions and capacities tabled. 4p.—*Spence Engineering Co., Inc., Walden, N. Y.* (226C)

Synthetic Rubber

Treats of applications for a new synthetic rubber product in highly corrosive situations. Gives performance characteristics over a range of conditions. 8p.—*E. I. du Pont de Nemours & Co., Elastomers Div., Wilmington, Del.* (226D)

Heating System Control

Discusses control of hot water and steam radiation systems for plant heating. Graphs and diagrams illustrate theory. Data Sheet CA-12, 4p.—*Barber-Colman Co., Rockford, Ill.* (226E)

Piping Insulation

Features of an insulating material made from an inert silica aggregate are detailed. Compound said to be strong, efficient, and easily handled. 8p.—*Johns-Manville, New York City.* (226F)

Tough Concrete Floor

Considers wear-resistance of an armored, concrete flooring composed of metallic aggregate. Installation instructions are included. 4p.—*Master Builders Co., Cleveland.* (226G)

MAINTENANCE

Floor Polishers

Leaflet shows line of single and 4-brush, rotary floor polishing machines. Units are recommended for 1,000 to 20,000 sq. ft. of floor area. 2p.—*Multi-Clean Products, Inc., St. Paul, Minn.* (226H)

Stairway Sweeping

Bulletin board poster shows correct way to sweep stairways. Illustrated sheet is designed to serve as training aid for sanitary maintenance employees.—*National Sanitary Supply Assn., Chicago.* (226I)

Rust Prevention

Informative 1956 catalog presents wide line of rust inhibitors, heat and chemical resistant coatings, and floor and deck coverings. Chips show available colors. Among products are lead-less and mildew-resistant coatings for food processing applications. 28p.—*Rust-Oleum Corp., Evanston, Ill.* (226J)

Shafts, Rolls, Rods

Gives selection data for case-hardened stock material used in making shafts, rolls, guide rods, and other long-round parts. 5p.—*Thomson Industries, Inc., Manhasset, N. Y.* (226K)

Heat Treatment of Welds

Technical bulletin gives comprehensive information on post-heating of welded joints to relieve stresses and strains. Covers application to air-hardening alloys. Bulletin PR543, 10p.—*Babcock & Wilcox Co., Beaver Falls, Pa.* (226L)

Lubrication Ideas

Considers five plans for better plant lubrication. Equipment and methods for cutting waste and labor in plant greasing schedules are shown. 12p.—*Alemite Corp., Chicago.* (226M)

Goggles and Helmets

Illustrates full line of safety glasses for protection during chipping, grinding and welding operations. Also shows face shields and welding helmets. Catalog G-52, 14p.—*Pulmosan Safety Equipment Corp., Brooklyn.* (226N)

Vibration Mountings

Concerns line of rubber-in-shear mountings for reducing vibration and noise of light and medium weight machinery. Load capacities range from 40 to 10,000 lb. Catalog RS-55, 4p.—*T. R. Finn & Co., Inc., Hawthorne, N. J.* (226O)

Floor Cleaning Equipment

Considers a wide line of pails, mops, and mop wringers for efficient floor sanitation. Discusses proper care of equipment for longer life. Catalog 955, 19p.—*Geerpres Wringer, Inc., Muskegon, Mich.* (226P)

Fat Filter

Gives facts on compact, jet-type fat filter for use on deep fryers. Drawings show installation, diagrams illustrate filtering action. 4p.—*Mies Filter Co., Milwaukee* (226Q)

Metal Disintegrators

Shows operation and features of a metal disintegrating device for

cutting holes and removing broken taps, studs, and reamers. Cutting is done by a low-voltage arc. Bulletin 541, 4p.—*Electro Arc Mfg. Co., Ann Arbor, Mich. (226R)*

Folding Scaffold

Considers advantages of a lightweight, folding aluminum scaffold for plant maintenance work. Caster-wheeled unit can be adjusted to over 17 ft. high. Bulletin ASF-1, 6p.—*Patent Scaffolding Co., Inc., Long Island City (227A)*

Welding Data

Gives recommended arc welding procedures for joining tubing and pipe—stainless steel to stainless steel and stainless to carbon steel. Carbon molybdenum and chromium molybdenum alloy steels are also covered. Technical Data Card 162A, 4p.—*Babcock & Wilcox Co., Beaver Falls, Pa. (227B)*

Wooden Floor Care

Bulletin board poster depicts proper technique for sanding and sealing wooden floors. Bulletin Board Edition 4.—*National Sanitary Supply Assn., Chicago. (227C)*

Respirator Line

Shows a series of cartridge-type respirators used in painting and in gas-filled atmospheres. Unit is light-weight, compact, and gives high visibility. Bulletin 107-6, 4p.—*Mine Safety Appliances Co., Pittsburgh. (227D)*

Storage Containers

Presents a series of drums, canisters, and cans for storage of inflammable liquids and solids. Dispensing valves illustrated. Waste disposal units covered. 2p.—*Protectoseal Co., Chicago. (227E)*

MATERIALS HANDLING

Automatic Tractor

Gives facts on an electric, warehouse tractor that needs no human operator. Overhead guide wire can be quickly strung in any desired path. Electronic detector on unit follows wire system and is controlled from signal boxes installed throughout the plant. Bulletin 552-1, 8p.—*Barrett-Cravens Co., Northbrook, Ill. (227F)*

Versatile Lift Trucks

Company magazine shows wide variety of lift truck attachments such as a revolving clamp, hydraulic scoop, unloader, side shifting fork, load stabilizer, hydraulic keg handler, and carton clamp. Also listed is a rugged, walking-type pallet truck. *Handling Material Illustrated*, Jan. '56.—*Towmotor Corp., Cleveland, (227G)*

Pneumatic Fittings

Details a series of impact-type elbows for pneumatic materials handling systems. Heavy, abrasion-resistant bends can be quickly changed when worn. Data Sheet Wb, 2p.—*Allen-Sherman-Hoff Co., Wynnewood, Pa. (227H)*

Belt-Conveyor Idlers

Concerns a series of ball-bearing conveyor idlers in factory-sealed and grease-fitting models. Component parts are illustrated by detailed drawings. Selection data is tabled. Folder 2516, 6p.—*Link-Belt Co., Chicago. (227I)*

Canvas Conveyor Belts

Series of engineering tables presents specifications for untreated, waxed, bituminous and oil-stitched canvas conveyor belts. Power transmission application also shown. 16p.—*Main Belting Co., Middletown, Conn. (227J)*

Flighted Chain Conveyor

Informative manual shows construction and installation of a complete handling system for granular or powdered products. Setup includes feeder and elevator. It conveys by means of a flighted endless chain enclosed in a close-fitting tube. System moves materials horizontally and vertically. Book 2475, 28p.—*Link-Belt Co., Chicago. (227K)*

Electrified Crane Rail

Full particulars on an inverted-Y electric rail for cranes and runways. Detailed drawing shows conductor assembly for the line, which is available in 300-, 500-, and 1,000-amp. capacities. Catalog 2021-A, 8p.—*Cleveland Crane & Engineering Co., Wickliffe, Ohio. (227L)*

Dock Loading-Ramps

Concerns operation of an automatic, self-leveling dock ramp to ease truck loading. Pictures show operation, text describes advantages, and selection data. Bulletin D-153, 4p.—*Kelley Co., Inc., Milwaukee. (227M)*

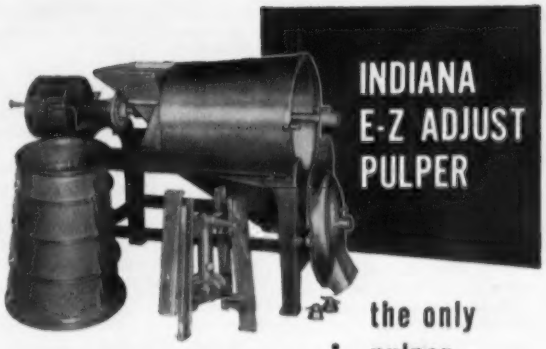
PROCESSING

Product Mixers

Detailed cut-away drawing shows gear-reducing mechanism for a series of turbine- and paddle-type fluid agitators. Second drawing shows mechanical seals for enclosed-tank agitation. Bulletin A-255, 6p.—*Philadelphia Gear Works, Inc., Philadelphia. (227N)*

Colloid Mills

Presents operation information and capacities of a series of standard and sanitary colloid mills for smooth blending and emulsifying of a wide range of food products. 8p.—*Chemicolloid Laboratories, Inc., Garden City Park, L. I., N. Y. (227O)*



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the only pulper you can adjust INSTANTLY for quick, POSITIVE quality control

A simple turn of the adjusting wheel provides any degree of pomace you want . . . wet or dry . . . while the pulper is in operation! Wheel changes clearance between paddles and screen *instantly*.

Built for heavy duty, peak load service with a minimum of upkeep. Capacities up to 40 tons per hour. All parts easily accessible for thorough cleaning. For use with tomatoes, pumpkin, sweet potatoes, berries and all kinds of fruit. Ideal for baby foods.

Make 1956 your modernization year!

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STAINLESS STEEL
INSTANT DISCONNECT
COUPLING

Is rust or corrosion in your lines a problem? Must your lines resist acids, remain sanitary? Now you can get immediate shipment from our factory of #303 and #316 Stainless Steel Snap-Tite Couplings. No waiting for special production runs on sizes through 2".

Steady demand has made Stainless Steel Couplings a standard Snap-Tite product. And, because they're standard, the price is lower.

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See Snap-tite's representative... or write for Bulletin 240

Snap-tite, INC.
UNION CITY 6, PENNSYLVANIA

Batching Systems

Comprehensive catalog considers wide line of weighing, batching, and proportioning systems. Numerous photographs illustrate installations, extensive use of diagrams show operating principles. Catalog 841, 58p.—*Jeffrey Mfg. Co., Columbus, Ohio. (228A)*

Viscosity Controller

Gives engineering principles and operating facts of an automatic viscosity controller for continuous indication, recording, and control of liquid viscosities under processing conditions. 18p.—*Brookfield Engineering Laboratories, Inc., Stoughton, Mass. (228B)*

Synthetic Filter Cloth

Depicts construction and advantages of Dynel, Nylon, Orlon, polyethylene, and Saran filter cloth materials. 6p.—*Filtration Engineers, Inc., Newark, N. J. (228C)*

Small Bakery Freezer

Leaflet concerns a compact, 25-pan, upright freezer for baked goods. Unit is completely vapor-sealed and insulated with glass fiber material. 2p.—*Rhodes Refrigeration Co., Portland, Oregon. (228D)*

Product Sifter

Treats of a ceiling-suspended, self-balancing sifter, featuring stainless steel sieves with removable screen frames. Bulletin 136, 4p.—*Sprout-Waldron & Co., Inc., Muncy, Pa. (228E)*

Industrial Filters

Large diagrams show filtering action in industrial-sized pressure leaf filters. Units are available in two models: A complete filtration system, comprising a filter, pumping unit, precoat slurry tank, and all necessary fittings and valves; and a model consisting of the filter alone. Bulletin 111-112-1155, 8p.—*Industrial Filter & Pump Mfg. Co., Chicago. (228F)*

Special Mixer

Leaflet depicts a special, centrifugal mixer that incorporates a unique impeller to give threefold mixing action. 2p.—*Neumann & Weaver, Inc., Fairlawn, N. J. (228G)*

Industrial Homogenizers

Considers features of a series of homogenizers for use in the food industry. Describes five special valve designs for handling viscose, slightly abrasive and very abrasive fluid products. Selection data covers models with capacities up to 8000 psi and 6000 gph. Bulletin H-55, 6p.—*Manton-Gaulin Mfg. Co., Inc., Everett, Mass. (228H)*

Hop Separator

Illustrates vortex-type machine for separating hops from wort in beer-making process. Screened conveyor bed allows thorough draining of the spent material. Water connections for sparging are provided. Bulletin HS-955, 8p.—*Louis DeMarkus Corp., Buffalo. (228I)*

Canning Equipment

Large catalog illustrates and describes complete line of canning equipment for tomatoes, fruits, root vegetables, and pumpkin products. Also listed are pumps, hoists, and other accessory equipment. 144p.—*F. H. Langsenkamp Co., Indianapolis. (228J)*

Fluid Pasteurizer

Facts on a pasteurizing unit employing two concentric tubes. Machine heats liquids from both sides. Easy disassembly speeds cleaning. Single-use paper gaskets eliminate costly seals. Bulletin 603, 4p.—*Chicago Stainless Equipment Corp., Chicago. (228K)*

Beef Dressing Line

Detailed photos and diagrams illustrate layout for completely dressing beef on a moving overhead conveyor. Setups are available that handle up to 150 cattle per hour. 14p.—*Globe Co., Chicago. (228L)*

Custom Fabrication

Describes services available from a custom fabricator of process equipment. Illustrates dairy and poultry equipment made by the manufacturer. 30p.—*Paul Mueller Co., Springfield, Mo. (228M)*

Glassed-Steel Reactors

Covers a series of 5-to-100-gal. steel reactors that are protected from corrosive foods by glass linings. Photos and drawings show available shapes and operating components. Bulletin 927, 8p.—*Pfaudler Co., Rochester, N. Y. (228N)*

INSTRUMENTS

Test Instruments

Describes wide line of insulation testers, ground testers, ohmmeters, motor rotation testers, frequency meters, resonant tachometers and thickness gages. Each unit is illustrated. Bulletin 19-56, 16p.—*James G. Biddle Co., Philadelphia. (228O)*

Electronic Level Control

Leaflet illustrates method of electronic liquid-level control in processing tanks. Unit utilizes two probe rods to govern maximum and minimum limits. Bulletin ALC-2.1, 2p.—*Machinery Electrification, Inc., Northboro, Mass. (228Q)*

Pressure Measurement

Company magazine contains interesting article on development of Bourdon tube pressure gages. Many diagrams and drawings illustrate operation. *Taylor Technology*, Fall 1955 Issue.—*Taylor Instrument Co., Rochester, N. Y. (228P)*

Pressure Controller

Comprises selection facts on a series of pneumatic, indicating pressure controllers available in four ranges from 0 to 200 psig. Bulletin 7040, 2p.—*Minneapolis-Honeywell Regulator Co., Philadelphia. (228R)*

QUALITY CONTROL

Oxygen Analyzer

Bulletin explains principle, construction and operation of a paramagnetic oxygen analyzer and electronic recorder. Pictures show unit and component parts, drawings illustrate gas sampling systems. Bulletin 55-829-56, 16p.—*Hays Corp., Michigan City, Ind. (228S)*

Laboratory Equipment

Latest company bulletin shows line of balances, cabinets, laboratory furniture, plastic utensils, and other lab-ware. *Laboratories*, March, 1956, 16p.—*Schaar & Co., Chicago. (228T)*

Apparatus Line

Catalog depicts wide line of laboratory apparatus such as balances, funnels, burners, and flash evaporators. *Apparatus Review No. 6*, 12p.—*Arthur S. LaPine & Co., Chicago (228U)*

Simple Spectroscope

Describes a moderately-priced spectroscope for qualitative and semi-quantitative analysis of 61 elements. Unit is said to be relatively simple to operate and requires only small samples. Bulletin SS-258, 4p.—*Fisher Scientific Co., Pittsburgh. (228V)*

MANAGEMENT

Paper Fastener

Folder shows new office device for fastening papers together by a crimping action. Resultant bond is said to be as strong as the paper itself. 4p.—*Bathrick-Collins, Inc., Medina, N. Y. (228W)*

Occupational Health

Discusses age as it affects the ability of people to work. Bulletin is designed as an aid to placement of older people in industry. 12p.—*Occupational Health Institute, Inc., New York City. (228X)*

for greater pump efficiency

USE Royal Crown PUMP VALVES

"the valve with a 1000 seats"

Round valve surface is streamlined. No obstructions to restrict the flow.

Ball-guided valve rotates and swings with each stroke of the pump. Each turn, each swing — a lapping action, a continuing perfect seat

Free vertical action assures instant opening and closing. Ball stem is a frictionless guide.

Here's a revolutionary idea in pump valves that results in *much longer, trouble-free valve life and greater pump capacity.*

Royal Crown Pump Valves are guided by a frictionless ball stem (not a rigid guide) which allows them to oscillate and turn with the fluid stream. They swing freely with each stroke of the pump — seating perfectly each time in a new position. There is a minimum of resistance to the fluid which results in greater pump volume at less pump speed.

OUTSTANDING FEATURES

- No springs required to force the valve to seat
- No crossbars in seat to restrict the flow.
- Valve cannot bind in any position — will not flutter
- Releases and seals the flow instantly
- Adaptable to all reciprocating pumps

BLH MADSEN WORKS

CONSTRUCTION EQUIPMENT DIVISION

Baldwin-Lima-Hamilton Corporation

14130 EAST ROSECRANS AVENUE • P.O. BOX 38 • LA MIRADA, CALIF., U.S.A.

Write for FREE literature

PROFESSIONAL SERVICES

PROCESSING PROBLEMS — PRODUCT DEVELOPMENT — MARKET RESEARCH —PLANT LAYOUT and DESIGN—PACKAGE DESIGN and TESTING MANAGEMENT — PUBLIC RELATIONS — GENERAL CONSULTING — PATENTS — CHEMICAL, BACTERIOLOGICAL and NUTRITIONAL ANALYSIS

J PAUL BISHOP & ASSOCIATES
Registered Professional Engineers
Established 1945
Specializing in:
Food and Chemical Processes
Consultation—Surveys—Design
Engineering—Estimates—Supervision
of Construction, Installation and Start-Up.
Internationally Known
P. O. Box 348 Champaign, Illinois

GUSTAVE T. REICH & ASSOCIATES
Consultant to the Food Industries.
COMPLETE CONTINUOUS PROCESSES.
Operation — Waste Disposal
AUTOMATION
1422 Chestnut St. Philadelphia 2, Pa.

STRASBURGER & SIEGEL
Chemists—Bacteriologists—Food Technologists
Specialists in Canned and Glassed Foods
Laboratory Services
Testing Tomato Products, Mayonnaise, Pickles, Oils, Fats, Beverages, Sugars, Filth in Foods, Food and Drug Libels, Expert Testimony
1403 Eutaw Place Baltimore 17, Maryland

FOOD DEVELOPMENT LABORATORY
S. W. ARENSON, *Director*
Ingredient evaluations • New Products development. Specializing in flour shortenings, milk and other basic ingredients • Facilities; chemical and physical laboratory, bakery, spray dryer and other unit process equipment.
2865 W. Franklin St. Baltimore 23, Md.
440 W. 24th St. New York, N. Y.

SCHWARZ LABORATORIES Inc.
Consultation on Food Problems
Analyses of Foods and Beverages
Food Plant Design and Process Improvement
Research and Investigations
Legal Testimony
Write for bulletin describing facilities and services
230 Washington St., Mount Vernon, N. Y.

WALTHAM LABORATORIES, INC.
LABORATORY SERVICES: Food analysis, extraneous matter, bacteriological tests. Water
FOOD PLANT SANITATION — INSPECTION & SAMPLING
817 Moody Street Waltham 54, Mass.

LEWIN ASSOCIATES
Industrial Consultants
DAVID N. LEWIN, Ph.D., FOOD CONSULTANT
JOSEPH D. LEWIN, CONSULTING ENGINEER
Design — Layouts — Investigations — Consultation — Reports — Market Investigations — Bakeries, Dairy Products—Food Preserving by Heat, Drying, Freezing — Consultation in Managing, Warehousing, Distribution — Formulae, New Products
243 West 56 St., N. Y. 19, N. Y. JUdson 6-1749

FOSTER D. SNELL
Research Laboratories
SENSORY PANEL TESTS
Food Analysis, Stability Studies, Evaluations, Packaging Problems, Vitamin Assays.
Write For
"Food Facts"
29 W. 15th St., N. Y. 11 WAtkins 4-5800

WISCONSIN ALUMNI RESEARCH FOUNDATION
Projects, Consultation, and Production Control Services in
Biochemistry, Chemistry, Bacteriology, Toxicology—Insecticide Testing and Screening.
Write for price schedule.
P. O. Box 2217-P. Madison 1, Wisconsin

WHERE TO STORE FROZEN FOODS

QUAKER CITY COLD STORAGE CO., INC.
PHILADELPHIA, PA.
3 WAREHOUSE LOCATIONS
Proper Temperature for Frozen Foods

WHERE TO BUY

For information on
WOOD PIPE • WOOD TANKS WOOD SPECIALTIES
contact
NATIONAL PIPE AND TANK CO.
2301 N. Columbia Blvd., Portland Oregon

INGREDIENTS FOR THE FOOD PROCESSOR

CARROT OIL makes food golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.
Carrot oil is preferred for vitaminising foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

SEND FOR BOOKLET
New 24-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!

NUTRITIONAL RESEARCH ASSOCIATES
205 Broad St., South Whitley, Ind.

the advertisements in the SEARCHLIGHT SECTION on the following pages

are live opportunities in the field of food processing and distribution.

Each announcement represents a current Want or Offering of an organization or individual in the field, with some element of profit in each for whoever can fill the need. Some have money-saving possibilities, others are opportunities for more business; still others offer property, or equipment—used or surplus new equipment.

"Searchlight" advertisements are constantly changing. New opportunities are constantly finding their way into this great Want medium, each issue. Regular reading of the "Searchlight" pages can be as important to you as reading the editorial sections; "Searchlight" is NEWS OF OPPORTUNITIES offered in the industry.

for EVERY business WANT "Think SEARCHLIGHT first"

EMPLOYMENT OPPORTUNITIES

The Advertisements in this section include all employment opportunities—executive, management, technical, selling, office, skilled, manual, etc.

Positions Vacant
Positions Wanted
Part Time Work
Civil Service Opportunities
Selling Opportunities Wanted
Selling Opportunities Offered
Employment Agencies
Employment Services
Labor Bureaus

DISPLAYED —RATES— **UNDISPLAYED**

The advertising rate is $15.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

An advertising inch is measured ⅞" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

$1.50 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.

Positions Wanted—The rate is one-half of the above, payable in advance.

Box Numbers—counts as 1 line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Not subject to Agency Commission.

Send NEW ADS to FOOD ENGINEERING, 330 W. 42nd St., N. Y. 36, N. Y. for May Issue closing April 26th

ADVERTISING MAN WANTED FOR TECHNICAL PRODUCTS

- Previous advertising experience not necessary but helpful. Must have at least two or three years of college with courses in engineering and technical subjects and like to write.
- If you have the qualification we have an opportunity open for you.
- Man selected will be trained in all phases of industrial advertising.
- In your letter of application state age, education, positions held, and give statement of why you want a career in advertising. Location: well-known Connecticut company.

P-1206, Food Engineering
330 W. 42 St., New York 36, N. Y.

SALESMEN

For canning machinery sales and customer contact work. Several openings available. Applicants with mechanical or chemical engineering degree and cannery experience preferred. Please send resume of education, exprience, references, salary requirement and recent photo, if available, to:

Canning Machinery Division
FOOD MACHINERY AND CHEMICAL CORPORATION
Hoopeston, Illinois

Attn: John R. Hughes, Personnel Mgr.

WE NEED

FOOD TECHNOLOGISTS and FOOD CANNING CANDIDATES
—junior to top-level

Call, write or wire:
Gladys Hunting (Consultant)
Drake Personnel, Inc.
220 S. State St., Chicago 4, Ill.
HArrison 7-4600

An employment advertisement in this EMPLOYMENT OPPORTUNITIES section will help you find the engineers you need. It's an inexpensive, time saving method of selecting competent personnel for every engineering job.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITION VACANT

Wanted: Plant Manager and superintendent. Small but busy freezing plant Southwest. Full year's employment. Right man very close to top management. Write fully and give experience, references, salary desired. P-9591, Food Engineering.

SELLING OPPORTUNITY OFFERED

Established food manufacturer of institutional food specialty products, in business for over 50 years, is desirous of securing food brokers or commission salesmen who are presently selling food items to the institutions market in key areas throughout the country. Give present lines and territories covered. Address Mr. Milton Baldock, G. A. Goodrich Company, 4139 W. Grand Avenue, Chicago, Ill.

POSITIONS WANTED

Food and Milling Engineer mechanical, experience engineering direction of multi-plant operations, infant and specialty foods, feeds, pharmaceuticals etc., able to develop new laboratory products and processes into plants. Reply PW-1231, Food Engineering.

POSITIONS WANTED

Food Dairy Technologist—Chemical Engineer extensive varied experience technical engineering, supervision, quality control, process operation, personnel, maintenance, production. Knows research, development, modernization, construction. Seeks high level liaison, managerial, executive responsibilities. PW-1236, Food Engineering.

Manager Available background production, technical-misc. Food, cereals, baking mixes. Reply PW-1263, Food Engineering.

Executive sales. Foods, bakery, allied fields. Promotion, direct, jobber, broker, chain experience. Fred G. Orcutt, 209 W. Jefferson Ave., Naperville, Ill.

Chemist—Ph.D. 8 yrs. research, product development, food & dairy. Products marketed. Director of Research. Desire responsible position. PW-1232, Food Engineering.

Food Technologist. (B.S.), graduate June 1956, 27 years old, with 6 years electronic background, (Navy ET2) desires position in food industry requiring electronic application, preferably in western part of country. PW-1176, Food Engineering.

Food Plant Engineer experienced in plant lay-out, installation, application and processing. Desires association with progressive concern or consulting organization. PW-1177, Food Engineering.

SEARCHLIGHT SECTION

(Classified Advertising)

BUSINESS OPPORTUNITIES EQUIPMENT - USED or RESALE

UNDISPLAYED —RATES— *DISPLAYED*

$1.50 a line, minimum 3 lines. To figure advance payment count 5 average words as a line. BOX NUMBERS count as one line additional in undisplayed ads.

DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

The advertising rate is $13.25 per inch for all advertising apearing on other than a contract basis. Contract rates quoted on request. AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page.

EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style.

Send NEW ADVERTISEMENT to N. Y. Office, 330 W. 42nd St., N. Y. 36, N. Y. for May issue closing April 26th

FOR SALE

3—250 Gal. Hamilton Style "A" Jacketed Stainless Steel Kettles

Late Style. Used only one day.

OHIO CREAMERY SUPPLY COMPANY
701 Woodland Ave. Cleveland 15, O.

WEIGH TANK

Mojonnier 1000# complete with air valve compressor and vacuum sampler.
Price $1000.

WOHLT CHEESE CORPORATION
Fremont, Wisconsin
Phone 6-3241

"Day" #6 Double Arm Mixer; 100-8000# Mixers, all types. Bag Fillers; 1000 gal. SS Tanks; Roller mills 5x12, 12x32, 16x40; 40 HP motor; Complete liquid & powder filling-packaging lines, cheap; Rotex #7 sifter; 24x24 alum. FP; Simplex cellophane bag formers & sealers.

I. E. NEWMAN, 5602 Blackstone, Chicago 37

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

BUSINESS OPPORTUNITIES

Wanted: Well rated food company desiring to add processing of pickle products to present lines. Fresh-pack salt stock, all varieties to Jar, Sweet, Dill etc. Successful food chemist 20 years consulting experience. BO-8290, Food Engineering, 520 N. Michigan Ave., Chicago 1, Ill.

Business Opportunities—Small plant, manu-facturing fountain toppings and syrups, flavors, colors. Selling through jobbers. Located in Ohio. BO-1262, Food Engineering.

When Answering
BOX NUMBERS . . .

to expedite the handling of your correspondence and avoid confusion, please do not address a single reply to more than one individual box number. Be sure to address separate replies for each advertisement.

IN STOCK AT LOEB'S

Cappers: Capem, Titecap, Swanson, U. S. automatic and semi-automatic.
Centrifugals: Fletcher 12" copper, 17" stain. steel, 20" lithcoated, Tolhurst 26" copper.
Clarifiers: De Laval model 84-51. Sharples Vaporite, st. steel.
Conveyor, port. Rapid Standard, 16' lg.
Conveyor Tables: belts from 5½" wide x 12' long and up.
Cutter, Bone: Wausau, 5 hp.
Cutters, silent, Buffalo 32" and 43".
Dryer: Devine 2 x 4' vac. drum, st. steel.
Dryers: vacuum shelf, Stokes 20 shelf, Devine 10 shelf. Devine 20 shelf.
Extractor: Troy 26" monel basket.
Fillers, liquid: Peerless 6 valve, Cass gross weight, siphon and vac. types.
Fillers, piston: Stokes, Colton, Elgin, Filler Machine Co. for jars, tubes.
Fillers, powder: Speedee, Triangle, Stokes & Smith, Ferguson, Gump.
Filter Presses: Sperry, Shriver 6"-36", recessed and plate and frames types.
Filters: int. pressure—Alsop, Sparkler, Lomax, Industrial, Sweetland.
Filter, vacuum: Oliver 2½x1', Denver 1x3'.
Fryolators: Pitman gas fired 18" well.
Homogenizer: 2-1200 GPH. Union, 300 GPH. Union, 125 and 400 Gph. Gaulin.
Kettles: Stainless steel 5 to 300 gal., with and without agitators, aluminum 40 to 100 gal.
Labelers: Burt, Knapp, New Jersey, World, Ermold—auto and semi-auto.
Colloid: Premier 3 hp. and 5 hp.
Hammer: Mikro, 2DH, 2TH, Gump #1, Prater, Raymond, Jay Bee, Jeffrey 30 x 24", Williams #2 and BX.
Mixers: Dough type single and double arm, 5 to 100 gal.
Powder: 50 to 2000 lb. capacity.
Portable Electric: ¼ to 5 hp.
Pasteurizer: Wallace-Walker plate type, 200 GPH., st. steel.
Pumps: Centrifugal, rotary, gear, vacuum, all types and sizes.
Retorts: 42 x 72" and 24 x 30".
Screens: Rotex 20 x 48", 42 x 84". Roball 40 x 120" stainless steel. Selectro 4 x 10', Abbe Blutergess #1.
Sealers, carton: Standard-Knapp, Ceco, Triangle, Packomatic.
Sterilizers: Climax 20" x 36" jacketed.
Tablet Presses: single punch and rotary.
Tanks: Glass lined, various sizes. Stain. steel 25 gal. to 1200 gal.
Viscolizer: 150 gal. Cherry-Burrell.

Send us your inquiries and list of idle equipment.

LOEB EQUIPMENT SUPPLY CO.
820 West Superior St. Chicago 22, Ill.
Telephone: Seeley 8-1431 Our 31st Year

SPRAY DRYING UNIT

We offer for immediate sale

One—Drying and Concentrating Company's spray drying unit complete with stainless steel drying chamber, air heating unit and filter, pumps, thermometers, preheaters, etc.

Open to inspection at any time at our plant at Peoria, Illinois.

ALLIED MILLS, INC.
P. O. Box 539 Peoria, Illinois

2—600 gal. S.S. vacuum processors equipped for heating and cooling self contained ammonia to sweet water circulating system.
1—C-B Superplate, double frame, 140 S.S. plates, 5 transfer headers.
1—Model 8-5 Mojonnier S.S. Tubular Heat Exchanger.
1—S.S. Plastic Cream Cooler.
1—1200 gal. vertical, Jensen, S.S. coil vat.
2—600 gal. copper hot wells.

NEENAH MILK PRODUCTS Co.
Neenah, Wisconsin

FOR SALE

1—150 SQ. FT. STAINLESS HEAT EXCHANGER, SHELL AND TUBE, #4 FINISH
1—2,000 GAL. STAINLESS HORIZONTAL OVAL TANK, #4 FINISH
1—800 GAL. STAINLESS RECTANGULAR INSULATED TANK, #4 FINISH
1—600 GAL. STAINLESS VERTICAL, AGITATED, INSULATED TANK, #4 FINISH
2—14,000 GAL. GLASS LINED, HORIZONTAL, ALL WELDED TANKS
1—36" MOJONNIER STAINLESS VACUUM PAN, 36 SQ. FT. COIL SURFACE, #4 FINISH
4—VACUUM PANS, STAINLESS #4 FINISH 66 TO 315 SQ. FT. COIL SURFACE
2—24" x 36" AND 32" x 120" DOUBLE DRUM DRYERS, ATMOSPHERIC

BEST EQUIPMENT COMPANY
617 Davis Street Evanston, Illinois
DAvis 8-0926

NO BETTER MACHINES AT ANY PRICE

3—Shriver 42"x42" cast iron, plate & frame closed del. Filter Presses, 27-1" chambers.
3—Day 15 gal. Pony Mixers, m.d. S.S. cans.
2—Haskins Cap Tighteners, m.d.
1—4TH Mikro Pulverizer 60 HP, tefc.
2—Stainless Steel Hersey Rotary Dryers, 5'x26' and 6'x23'.
2—8'x125' Rotary Kilns.
3—Buflovac 42x120, 32x120 Atmos dbl. Drum Dryers, complete; 1—American 24x36.
2—54"x70" and 1—40"x60" Bird Continuous Centrifugals, S/S Solid bowls.
3—Unused #12 Sweetland FILTERS, 48 bronze monel covered bottom drainage leaves 3" o/c. latest type: 1—#2, 23 copper leaves 1⅛" oc.
1—Day #30 Imperial jack. Mixer, 75 gal.
1—Buflovac 48"x40" Drum Flaker, chrome plated, s/s ends.
9—Sperry 18"x8" Filter Presses, 11 ch.
1—Link-Belt Co. ROTARY DRYER, Roto-Louvre, #502-16 Type C, 5'3" dia. 16' long with #304 S/S contact parts.
5—Horiz. Dry Powder Ribbon Mixers, 4000#, 1500#, 500#.

Our 39th Year

Consolidated Products Company, Inc.
158 Observer Hgway
HOBOKEN, NEW JERSEY
Tel.: HO 3-4435 • N. Y. Tel.: BA 7-0600

E.C.H. SPECIALS

Biner Ellison, Mod. 16Q Filamatic.
Rotex 40 x 84 Sifter, 3 deck 2 H.P. Mtr.
New 74 cu. ft. SS Spiral Mixer.
MRM S/S 12 Spout Rotary Vac. Filler.
New S/S Sturtevant #7 Rotary Blender.
Pneumatic Scale Labeler, serial 9894.
Capem SIF Capper, Caps up to 88 mm.
Standard-Knapp Wrap-around Labelers.
Phila. 2 piston S/S Filler, with motor.
Premier 5" SS Colloid Mill, 30 HP mtr.
Resina Capper, twin, 120 per min.

NEW—STEEL & S/S MIXERS, KETTLES, TANKS & DRYERS
Fabricated To Your Specifications
Engineering Advice Available

WE BUY COMPLETE PLANTS OR SINGLE UNITS
WHAT HAVE YOU FOR SALE?
YOU CAN BANK ON
EQUIPMENT CLEARING HOUSE, INC.
111 33rd Street, Brooklyn, N. Y.
SOuth 8-4451—4452—8782

FOR SALE

Complete Pneumatic Scale Straightline High Speed Cartoning Unit

In Excellent Operating Condition

Available For Immediate Delivery

AT A FRACTION OF THE ORIGINAL COST

These units consist of the following machines:

- High Speed Carton Feeder
- High Speed Bottom Sealer
- Type D-1 Wax Liner
- Six-Scale Net Weight Weigher
- High Speed Top Sealer with Compression Drying Unit
- All interconnecting conveyoring

This complete unit was in operation until recently.

Operated at approximately 70 units per minute.

INSPECTION CAN BE ARRANGED

Will sell as complete unit or as individual machines.

Write, Wire, or Phone Collect For Complete Details and For Our Special Low Prices

UNION STANDARD EQUIPMENT Co
318-322 Lafayette Street
New York 12, New York
Phone: Canal 6-5334

Get LOW COST PRODUCTION with good REBUILT EQUIPMENT

MIXERS

NEW and Rebuilt ribbon blenders: all sizes Heavy duty MASS Mixers

KETTLES-TANKS

Stainless Jacketed Kettles in stock all sizes up to 500 gal. Vacuum Pans, Evaporators; Stainless Mixing Tanks

DRYERS-STERILIZERS

Drum Dryers, Apron Dryers, Cabinet and Truck Dryers; Steam Jacketed Sterilizers up to 48" x 42" x 96"

PFAUDLER VACUUM PANS

and REACTORS; big stock of Glass Lined Jacketed Agitated Pressure Vessels

FILLERS

M. & S. 10 Pocket Stainless Can or Jar Fillers; others. FMC & Elgin Piston Fillers; Juice Fillers by FMC & Horix. Karl Kiefer Rot. Vac. Fillers

LABELLERS

Wrap Around Can Labellers; Aut. & Semi. Aut. Labellers by New, Jersey, World, etc.

MISCELLANEOUS

Filters, Filter Presses, Centrifugals, Extractors, Cutters, Dicers, Juice Extractors, Pulpers, Colloid Mills, Homogenizers. Case Gluers and Sealers and Packaging equipment.

Send us your Inquiry

FIRST MACHINERY CORP.
209-289 TENTH ST.
BROOKLYN 15, N. Y.
STerling 8-4672

FOR SALE

6—Rotary Hot Air Dryers, 5'8" dia. x 50' long
1—Buflovak #6.5 Stainless Steel Double Effect Evaporator—588 sq. ft.
1—Conkey Triple Effect Evaporator, Herculoy tubes—1900 sq. ft.—UNUSED
1—Goslin Birmingham Quadruple Effect Evaporator, copper tubes—685 sq. ft.
2—Davenport 2A Grains Presses
2—Davenport 6' x 40' Rotary Steam Tube Dryers
1—Stainless Steel Spray Dryer, 19' dia. x 20' high
1—Bowen 5 dia. Stainless Steel Spray Dryer
1—Overton 24" x 60" Double Drum Dryer —UNUSED
2—Double Drum Dryers, 24" x 36" drum
2—Triangle G-2-C Elec-Tri-Pak Weighers and Fillers
4—Mikro Pulverizers, #2DH, #2-TH, #3-TH
1—10,500 gal. Horizontal Stainless Steel Tank—UNUSED
25—Stainless Steel Tanks—30 gal. to 6500 gal.
10—4700 gal. Horizontal Brewery Glass Lined Welded Tanks
2—14,000 gal. Horizontal Glass Lined Welded Tanks
25—Stainless Steel and Stainless Clad Steam Jacketed Kettles, 40 gal. to 500 gal.
2—Mojonnier Stainless Steel Vacuum Fillers, model 90
1—Hope type 18 Semi-Auto Single Piston Filler, St. St., Rising Table, Agitated Hopper
2—Stainless Steel Selectro Screens, 2' x 7', two-deck, enclosed

BOTTLING CANNING MACHINERY PERRY SUPPLIES PROCESSING

PERRY EQUIPMENT CORP.

1411 N. 6TH ST.
PHILA. 22, PA.

Phone:
STevenson 4-7210

A BRILL BUY
. . . IS THE BEST BUY

SPECIALS

1—Buflovak #6.5-29-D double effect S/S Evaporator.
1—I.R. 208 ton Jet Refrigeration unit.
1—Buflovak 32"x90" double drum Dryer.
1—Buflovak 6' x 5'6" Monel, single drum Flaker.
1—Struthers-Wells 5' x 15' nickel Rotary Vacuum Dryer.
1—Hersey 18"x12' Hot Air Rotary Dryer 304 S/S.
3—Elmco 18"x24", 18"x12", 316 S/S Rotary Vacuum Filters.
2—Bird 18"x28" solid bowl, Continuous Centrifuges 310 S/S.
1—Fletcher 20" Suspended type Centrifugal 304 S/S.
4—Sweetland Filters #3, #5, #7, #12.
6—Day "Cincinnatus" Sigma Blade Mixers 600, 200 and 100 gal.
2—Robinson 304 S/S Jacketed Powder Mixers, 90 cu. ft.
1—#18I Mikro Pulverizer 304 S/S.
1—#4TH Mikro Pulverizer, 40 HP motor.
2—Rotex Sifters 40"x120", 40"x84".

BRILL EQUIPMENT COMPANY

2401 Third Ave., New York 51, N. Y.
OR
4101 San Jacinto, Houston 4, Texas

FOR SALE

30" Copper Coating Pans with stem coils
300 gal. Copper Still with condenser and tank
100 qt. 3 speed Read Master Mixer
80 qt. M-80 4-speed Hobart Mixer
100 gal. Copper Steam Jacketed Mixing Kettle
York Freon Compressor with 1½ HP 3 phase motor
Burns Split Nut Peanut Blancher

SAVAGE BROS. CO.
2636 Gladys Ave. Chicago 12, Ill.

FOR SALE

100 to 300 gal. S.S. Mix Tanks, water jkt.
225 gal. Vert. S.S. Tanks, insulated.
250 gal. Vert. S.S. Tank, insul., agit.
3—475 gal. Vert. S.S. Tanks, 3'6"x6'8".
650 gal. Horiz. S.S. Tank, insul., 4'x7'.
500 gal. Pfaudler G.L. Tank, T.C. Coil.
42" Buflovak S.S. Vacuum Pan.
36" & 60" S.S. Vacuum Pans.
125 to 1500 gal. Homogenizers or Viscolizers.
3000 gal. Glass Lined Tanks, insulated.
3—#10BB Waukesha Pumps, 1 H.P.
#25BB & #55BB Waukesha Pumps.
50 gal. S.S. Premixer (Tank), side agit.
20" Vorcione Centrifugals, copper baskets.
Hobart Grinder, 1½ H.P.
3 H.P. Frick Freon Compressors.
Milk Pasteurizers, Coolers, Fillers, Washers.

Send us your inquiries

LESTER KEHOE MACHINERY CORP.
1 East 42nd Street New York 17, N. Y.
Murray Hill 2-4616

THE MACHINERY & EQUIPMENT CORP.
293 Frelinghuysen Ave. Newark, N. J.

***SERVICE?* BETTER!**

SERVING THE FOOD and CANNING INDUSTRY for over 20 years with the best in USED and REBUILT PROCESSING and PACKAGING EQUIPMENT.

An Investment!

Productive advertising is an INVESTMENT rather than an EXPENDITURE.

"Searchlight" advertisers almost invariably report prompt and satisfactory results.

BE CONVINCED — send us your advertisement TODAY.

Address
Classified Advertising Division

FOOD ENGINEERING
330 WEST 42nd STREET
NEW YORK 36, NEW YORK

For Sale At Great Savings
MODERN REBUILT MACHINERY

UNION Rebuilt Machinery Established 1912

MIXERS

Day Robinson Dry Powder Mixers and Sifters, from 50 up to 10,000 lbs.
Day, New Era, Hottman Mixers 2 to 3500 gals. with and without Jackets, Single and Double Arm Agitators.
Rotex, Day, Robinson, Gayco, Tyler Hummer, Selectro Sifters.
Barbour-Stockwell 100 gal. Stainless Steel Steam Jacketed Paste Mixer.
Groen 150 gal. Stainless Steel Steam Jacketed Mixing Kettles.
Baker Perkins size 16-X-BB Vacuum Double Arm Steam Jacketed Mixer.

FILLERS & CAPPERS

Filler, Hope, Elgin S.S. Piston Fillers.
Elgin 24-Head Rotary Vacuum Filler.
Resina LC Automatic Capper.
Capem 4-Head Capper.
S. & S. G1, G2, G6, HG88 Auger Fillers.
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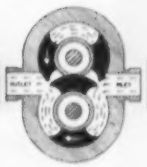

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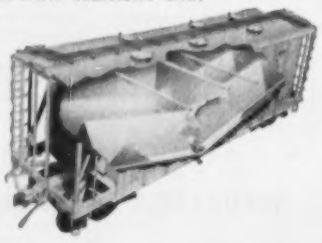

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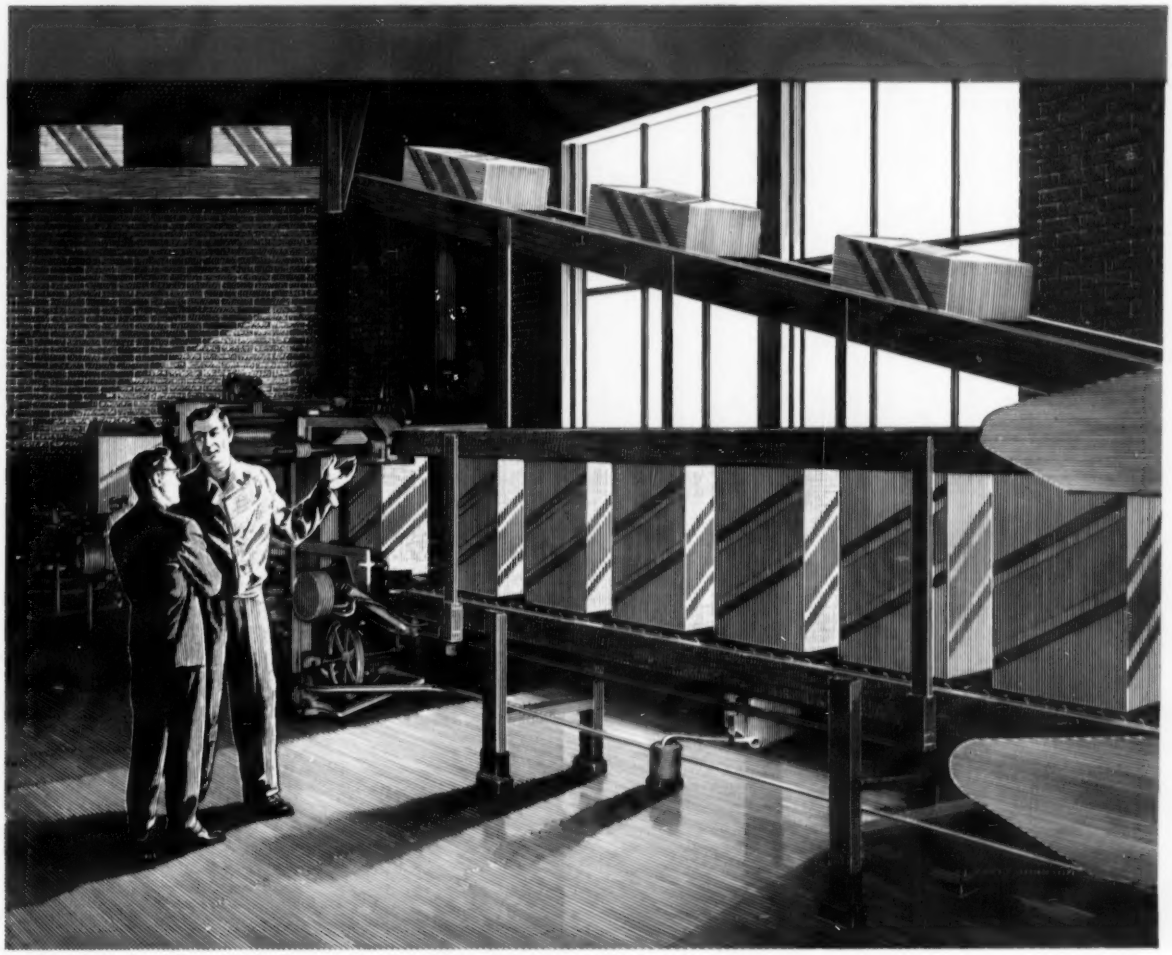

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